'Walk to Beijing' – A mixed methods evaluation of a financial incentive scheme aimed at encouraging physical activity participation in Sandwell, West Midlands.

Gemma Louise Hurst

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Contents

Abstract

Background. The many health benefits of physical activity are well established. In response to the low levels of activity in Sandwell, UK, the 'Walk to Beijing' (WTB) intervention aimed to increase lifestyle physical activity using financial incentives (in combination with a health assessment, pedometer and brief advice). ***Aim.*** To examine the benefits of a financial incentive scheme to promote physical activity, specifically walking, in sedentary adults. ***Methods.*** A mixed methods evaluation comprised: (1) outcome evaluation employing a pre-post intervention design to measure three- and six-month changes in physical activity, physiological and self-reported health; (2) process evaluation using semi-structured interviews to explore participant experiences, motivations towards physical activity, incentivised health schemes and WTB participation; and (3) mixed methods case-study approach using data at collected at six- and 12-month follow-up to further explore sustainability of behaviour change. ***Results.*** Three-month data were available for 1082 participants (64.5% of baseline sample). A statistically significant positive change from baseline to three-month follow-up was observed for stage of change ($p<.001$, $d=.63$), which was maintained (but not further improved) at six-months ($p<.001$, $d=.64$). Significant three- and six-month improvements were also found in objective (e.g., BMI, waist-hip ratio, waist circumference and blood pressure) and subjective (e.g., EQ-5D, SF12v2 and Theory of Planned Behaviour constructs) measures of health status. At baseline, 41.7% of participants cited the financial incentive as influencing their decision to take part. Qualitative data also identified that the financial incentive was the primary motivator for some, but not all, individuals; other intervention components were also motivators. ***Conclusion.*** Data suggested that financial incentives may promote participation in lifestyle physical activity through aiding uptake and sustaining engagement, however, other intervention components were also important. This research is the first to conduct an evaluation of a financial incentive scheme to promote physical activity comprising a combination of quantitative, qualitative and longitudinal case study methods to gain a unique and detailed insight into the area. Important implications for future research and practice were identified.

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Hurst, G., Davey, R., Grogan, S., & Clark-Carter, D. (2010). An outcome and process evaluation of a financial incentive scheme aimed at encouraging participation in physical activity in the area of Sandwell in the West Midlands region of the UK. Poster presented to the 11th International Congress of Behavioural Medicine, Washington DC, USA, August 2010. [Chosen as one of the top fifteen posters presented]

Hurst, G., Davey, R., Grogan, S., Clark-Carter, D., Stevens. D., & Manford, L. (2009). 'Walk to Beijing' – The use of financial incentives to promote physical activity in a deprived inner-city. Paper presented at the Division of Health Psychology Annual Conference, Aston University, UK, June 2009.

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List of Acronyms

BME	Black and Minority Ethnic
BMI	Body Mass Index
CCG	Clinical Commissioning Group
CET	Cognitive Evaluation Theory
CI	Confidence Interval
CHD	Coronary Heart Disease
CVD	Cardiovascular Disease
EQ-5D	Euro-Qol 5D Health State Questionnaire
IMD	Index of Multiple Deprivation
GP	General Practitioner
IPA	Interpretive Phenomenological Analysis
LAA	Local Area Agreement
LSOA	Lower Super Output Area
MET	Standard Metabolic Equivalent
NICE	National Institute of Clinical Health and Excellence
NHS	National Health Service
ONS	Office for National Statistics
SF12v2	Short Form 12 version 2
TPB	Theory of Planned Behaviour
TTM	Transtheoretical Model of Behaviour Change
WHO	World Health Organisation
WHR	Waist-Hip Ratio
WTB	Walk to Beijing

Glossary

Term	Definition
Census	Decennial official tally of the population to compile demographic, economic and social data pertaining to the population.
Clinical Commissioning Group (CCG)	Clinical Commissioning Groups are responsible for implementing the commissioning roles as set out in the Health and Social Care Act 2012.
Demographic	Relating to population composition (e.g. age; gender; ethnicity; socio-economic position).
Deprivation	Combination of circumstances that describe relative disadvantage of areas, usually based on the characteristics of the resident population.
Deprivation indices	Composite scores that combine area-level data on several socio-economic outcomes to identify geographical areas with a combination of circumstances indicating low living standards, a high need for services, or both.
Exercise	Planned, structured, repetitive and purposeful physical activity.
Exercise self-efficacy	Belief that exercise is, or is not, within an individual's control (Bandura 1986).
Extrinsic motivation	Doing something because it leads to a separable outcome (Ryan & Deci, 2000a).
Financial incentive	A monetary transfer, either in-cash or in-kind, provided directly to an individual with the intention to stimulate a behavioural change.
Gender	Non-biological differences between men and women in terms of cultural, social, and psychological factors.
Health	'A state of complete physical, mental and social well-being and

	not merely the absence of disease or infirmity' (WHO, 1948).
Health inequality	Disparities in health.
Intrinsic motivation	Doing something because it is inherently interesting or enjoyable (Ryan & Deci, 2000a).
Index of Multiple Deprivation	A composite measure of seven distinct dimensions of deprivation called Domain Indices, including: income deprivation; employment deprivation; health deprivation and disability; education, skills and training (children / young people sub-domain, skills sub-domain); barriers to housing and services (wider barriers sub-domain, geographical barriers sub-domain); and crime and the living environment (the indoors living sub-domain, the outdoors living sub-domain).
Lifestyle physical activity	the daily accumulation of 30 minutes of self-selected activities, which includes all leisure, occupational or household activities that are at least moderate to vigorous in their intensity, and could be planned or unplanned activities, that are part of daily life (Dunn, Andersen, & Jakicic, 1998).
MET (Standard Metabolic Equivalent)	Standard metabolic equivalent is a unit used to estimate the amount of oxygen used by the body during physical activity.
Motivation	To be moved to do something. Someone who is energised or activated toward an end is considered motivated.
Lower Super Output Area (OA)	Geographical areas with average population size of 1500 people.
Non-Communicable Disease	A medical condition or disease which is not contagious and is non-transmissible among people.
Physical activity	Any body movement produced by skeletal muscles that results in substantial increase over resting energy expenditure (Bouchard & Shephard, 1994).
Primary Care Trust	Free standing statutory bodies responsible for delivering better

(PCT)	health care and health improvements to the local area.
Self efficacy	The confidence an individual has for performing a behaviour in challenging or tempting situations (Marshall & Biddle, 2001) (p. 229).
Stage of change	Five stages of readiness which provide a framework for understanding the behaviour change process: precontemplation; contemplation; preparation; action; and maintenance.
Well-being	'A positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, and that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment, and a healthy and attractive environment' (DEFRA, 2010)(p. 106).

Chapter 1: Introduction

1.1 Introduction

This research examines the effectiveness of a financial incentive scheme aimed at encouraging physical activity participation in Sandwell, West Midlands: 'Walk to Beijing' (WTB). This concept related to the Olympic Games held in Beijing in 2008. It provided participants with a goal of collectively walking the distance to Beijing before the games began by incorporating physical activity into their daily lives. The intervention also used competition between the six towns of Sandwell. The research focused on evaluating participant outcomes and experiences of this behaviour change intervention. The WTB intervention consisted of the combined use of a financial incentive, pedometer and a brief intervention delivered via health assessments in various community settings. The WTB intervention was evaluated using a mixed methods approach and comprised analysis of: quantitative data on participant outcomes (Chapter 4); qualitative data exploring both participant outcomes and processes (Chapter 5); and in-depth case studies of four individual's using a mixed-methods approach (Chapter 6). This rich combination of data provided unique insight into the use of financial incentives (combined with other intervention components) to promote physical activity, making a novel contribution to this area. The merits of using a mixed methods approach are further discussed in Chapter 3 (Section 3.4).

Before discussing in more detail the related evidence base (Chapter 2), study context (Chapter 3) and WTB intervention (Chapter 4), this chapter contextualises the research, providing a brief outline of the prevalence and impact of physical inactivity, current physical activity recommendations and the UK policy and position statements. Relevant key terms are also defined.

1.2 Physical Activity and Public Health

Physical activity and public health is an emerging discipline. The health benefits of a physically active lifestyle are well documented and research demonstrates that physical activity is a significant predictor of cardiovascular disease, some cancers, type 2 diabetes mellitus, obesity, and mental health (Hallal et al., 2012b). The benefits

associated with physical activity are also related to an individual's overall health and well-being. Positive benefits include, better quality of life, improved sleep, reduced stress and depression, increased energy levels, self confidence, and satisfaction with social activity (Das & Horton, 2012). Epidemiological research also suggests that the lifespan of sedentary individuals is shortened by three to five years compared with regularly active individuals (Wen et al., 2011). Physical inactivity is recognised to be the fourth leading cause of global mortality. In the UK, the incidence of non-communicable disease which can be attributed to physical inactivity includes: 10.5% of coronary heart disease (CHD) cases; 18.7% of colon cancer cases; 17.9% of breast cancer cases; 13% of type 2 diabetes cases; and 16.9% of premature all-cause mortality (Lee et al., 2012).

The increased global incidence of sedentary living and the significant risk factors associated with physical inactivity has highlighted the importance of a physically active lifestyle. In response to this, the physical activity series published by the Lancet has recently emphasised the need for physical inactivity to become a public health priority to improve health and to reduce the burden of non-communicable diseases (Hallal, et al., 2012b).

1.3 Defining Key Terms

Within the literature, the terminology adopted in the study of physical activity and health has been inconsistent. This section will provide definitions to key terms associated with this research. The terms physical activity, exercise and physical fitness refer to different concepts, but are often used interchangeably. Caspersen, Powell, & Christenson (1985) defined ***physical activty*** as 'any bodily movement produced by skeletal muscles that results in energy expenditure'. Whereas, ***exercise*** is a subset of physical activity that is 'volitional, planned, structured, repetitive and aimed at improvement of maintenance of an aspect of fitness and health' (Biddle & Mutrie, 2007). It has been recognised that, for many, exercise is perceived as being vigorous, hard-work and potentially unpleasant and as a result there has been an increase in the need to promote 'lifestyle physical activity' (Killoran, Cavill, & Walker, 1994). ***Lifestyle physical activity*** is defined as the daily accumulation of 30 minutes of self-selected activities, which includes all leisure, occupational or household activities that are at least moderate to vigorous in their intensity, and could be planned or unplanned

activities, that are part of daily life (Dunn, et al., 1998). Lifestyle physical activity interventions focus on increasing activity whilst attempting to consider individual, cultural, and environmental differences. Throughout this thesis, the term physical activity will be employed with reference to lifestyle physical activity where appropriate.

The terms health and well-being will also be used in this thesis based on the following definitions. The World Health Organisation (WHO) defines ***health*** as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 1948). ***Well-being*** is recognised as a wider concept, being commonly understood as 'a positive physical, social and mental state; it is not just the absence of pain, discomfort and incapacity. It requires that basic needs are met, that individuals have a sense of purpose, and that they feel able to achieve important personal goals and participate in society. It is enhanced by conditions that include supportive personal relationships, strong and inclusive communities, good health, financial and personal security, rewarding employment, and a healthy and attractive environment' (DEFRA, 2010)(p. 106).

This research centres on the use of financial incentives to encourage behaviour change. A ***financial incentive*** can be defined as a monetary transfer, either in-cash or in-kind, provided directly to an individual with the intention to stimulate a behavioural change. There may also be conditions attached to the transfer, based on the behavioural change. A cash transfer can be used as a reward which may increase income so that it can be used to consume other goods and services, or it could be used as 'compensation' for the practical aspects of engaging in health-improving activities, such as time or money. Financial incentives can also be provided in the form of: an 'in-kind' subsidy for a specific activity (e.g. subsidised food and leisure centre vouchers); a subsidy to a provider to reduce the price of a health-improving service (e.g. zero co-payments for health professionals); or a tax that changes the price of a 'healthy' or 'unhealthy' good or service. 'In-kind' rewards may also include gifts or vouchers unrelated to the behavioural change, e.g., t-shirts, raffle tickets or entertainment vouchers. A financial incentive may also be employed in the form of a penalty for failing to conduct a socially desired health behaviour, e.g. the cancellation of a welfare benefit (Kane, Johnson, Town, & Butler, 2004b). Incentives are discussed in more detail with specific examples from the literature in Sections 2.5.4 and 2.6.

1.4 Physical Activity Recommendations

Current physical activity recommendations for adults are that they should accumulate a total of at least 150 minutes of moderate intensity activity, such as brisk walking, either in one session or in multiple bouts of at least 10 minutes duration (Chief Medical Officers of England, 2011). This equates to 30 minutes of moderate intensity activity on five or more days of the week. Moderate activity can be achieved through walking, cycling, gardening and housework, as well as various sports and exercise (Chief Medical Officers of England, 2011). Alternatively, comparable benefits can be achieved through engaging in 75 minutes of vigorous intensity activity over a seven day period or through a combination of moderate and vigorous activity. It is also recommended that adults should undertake muscle strengthening physical activity on at least two days per week and that the amount of time spent being sedentary for extended periods should be avoided for health improvement (Chief Medical Officers of England, 2011).

Traditionally, recommendations focused on promoting 30 minutes of moderate intensity (3-6 METs; see glossary for definition) physical activity on at least five days of the week and for those already taking some vigorous activity, three periods per week of vigorous physical activity of 20 minutes each (Department of Health, 1996). This was subsequently modified to a total of at least 30 minutes of at least moderate intensity physical activity a week on five days or more a week (Department of Health, 2004a). These guidelines also included the recommendation that levels of physical activity could be achieved through accumulating bouts of 10 minutes or more each day and that the activity could be lifestyle activity, structured exercise, sport, or a combination of these (Department of Health, 2004a). Walking at a moderate pace of 5 km/hour (3 miles/hour) has also been reported to expend sufficient energy to meet the definition of moderate intensity physical activity (Ainsworth et al., 2011). Therefore, walking as a *lifestyle* activity qualifies as health promoting physical activity for most individuals which is of particular relevance to the current research. Walking is an accessible, popular, familiar, convenient, and free form of physical activity and through which many sedentary individuals could gain the health benefits of moderate intensity physical activity (Ogilvie et al., 2007). Interventions to promote walking, therefore, have the potential to make a substantial contribution towards increasing the activity levels of the most sedentary. Promoting population shifts from no activity to some activity represents the transition with the greatest potential public health gain as the largest health gain

occurs for the first 15–29 min per day of exercise by inactive people (Wen, et al., 2011; Woodcock, Franco, Orsini, & Roberts, 2011). Therefore, in the context of this research investigating the WTB intervention (see Section 4.2), brisk walking qualifies as health enhancing physical activity (HEPA) for most people and is widely considered the most accessible form of activity (Ogilvie, et al., 2007) (see Section 2.3.2).

1.5 Prevalence and Impact of Physical Inactivity

The prevalence of physical activity in England is most commonly measured using self-report methods via surveys such as the Health Survey for England and the Active People Survey. In 2008, the Health Survey for England reported that 39% of men and 29% of women aged 16 and over met the government's recommendations for physical activity, compared with 32% and 21% respectively in 1997 (Health Survey for England, 2009). The Active People Survey also measures the number of adults aged 16 and over in England who meet the government's recommendations for physical activity, but with a focus on sport and active recreation (Sport England, 2011). A key finding from this report was that in 2010/11, 6.9 million adults (4.2 million men and 2.7 million women) participated in sport and active recreation three times a week for 30 minutes. The Active People Survey 5/6 (2010-11) found that the people of the West Midlands region are among the most inactive in the country. Within the West Midlands, Sandwell residents recorded the lowest rate of participation (15.5%); defined as those participating in sport and active recreation, at moderate intensity, for at least 30 minutes on at least 12 days out of the last four weeks (equivalent to 30 minutes on three or more days per week). Physical activity participation rates in Sandwell (15.5%) do not compare favourably with national figures (21.0%). Additionally, 60.1% of adults in Sandwell have not taken part in *any* moderate intensity sport and active recreation of 30 minutes duration in the last four weeks (Sport England, 2010). Given the low levels of physical activity participation in Sandwell, there is a clear need for physical activity interventions, such as WTB, to be delivered in this area.

The World Health Organisation (WHO) recognises physical inactivity as one of the leading global risk factors for premature morbidity and mortality (WHO, 2011). As noted in Section 1.2, physical inactivity can directly influence a number of risk factors, including adiposity, high blood pressure, high concentrations of blood glucose and a poor lipid profile. Research has also shown that participating in modest activity is

beneficial as those who are active but at levels less than recommended (approximately 1.5 hours per week) live three years longer than those who are inactive (Wen, et al., 2011).

Physical activity is also identified as positively contributing to the prevention and management of over 20 chronic diseases and conditions including, CHD, diabetes, cancer, mental health problems and obesity (Department of Health, 2005). Recent research from the World Health Organisation (WHO) highlighted the importance of physical inactivity as a major risk factor for CHD. As the fourth leading risk factor for global mortality, the WHO estimated that 6% of global deaths were caused by physical inactivity (Lee, et al., 2012). Between 20% and 35% of cardiovascular diseases could be prevented if more people become more active throughout the life course (Lee, et al., 2012; Wen, et al., 2011). In addition, it is estimated that with elimination of physical inactivity, life expectancy of the world's population might be expected to increase by 0.68 years (Lee, et al., 2012). In the UK, CHD is the most common cause of premature death (British Heart Foundation, 2012). Estimates have shown that more CHD deaths can be attributed to physical inactivity (37%) than to smoking (19%) or high blood pressure (13%) (Britton & McPherson, 2002).

Increasing the prevalence of physical activity not only has implications for the health of the individual, but also has significant economic consequences. The associated morbidity of health disorders associated with physical inactivity exerts a substantial burden on the UK health care system and impacts the UK economy. The direct financial cost of physical inactivity to the UK National Health Service (NHS) is estimated at £900 million (Scarborough et al., 2011). Allender, Foster, Scarborough and Rayner (2007) estimated the economic and health burden of disease related to physical inactivity in the UK and found that physical inactivity was responsible for 3.1% of morbidity and mortality. Physical inactivity was reported to contribute £1.1 billion to the direct health cost burden to the UK National Health Service. Estimates suggests that, in 2003–4, over 35 000 deaths could have been avoided if the population were physically active at the levels recommended by the UK government (Allender, et al., 2007). As discussed in the following section, this all combines to make a strong case for individual and government investment in physical activity.

1.6 Policy and Position Statements

In light of the well-documented health benefits, current levels and economic impact of physical inactivity, it has been recognised that promoting regular physical activity is a public health priority. Increasing levels of physical activity was identified as a priority for action in the recent government White Paper: *'Healthy Lives, Healthy People'* (Department of Health, 2010). The White Paper describes a new approach for public health in England and was followed by the Chief Medical Officer's (CMO) report *'Start Active, Stay Active'* (2011), which established a UK-wide consensus on the amount and type of physical activity that individuals should participate in across the life course. This paper built on the previous CMO report *'At least five a week'* (2004a) with guidelines for early years and older people are included for the first time.

Further emphasis was placed on the role and impact of ill health prevention in the Marmot Review: *'Fair Society, Healthy Lives'* (Marmot et al., 2010). This review aimed to provide recommendations to improve health and well-being and reduce health inequalities through six policy objectives, including 'to strengthen the role and impact of ill-health prevention'. Marmot et al. highlighted that many of the key health behaviours significant to the development of chronic diseases follow the social gradient, including, smoking, obesity, physical inactivity, and unhealthy nutrition. The reduction in health inequalities, therefore, requires a focus on improving these health behaviours, including physical activity.

The Foresight report (2007), *'Tackling Obesities: Future Choices'*, also highlighted the importance of improving population levels of physical activity. The report aimed to inform government strategies, policies and priorities in responding to the prevalence of obesity in the UK over the next 40 years. Tackling the prevalence of obesity is a societal challenge which requires change at multiple levels: personal; family; community; and national. This report emphasised the development of physical activity interventions in tackling levels of obesity in the UK (Foresight, 2007). Despite this, there is a danger that a focus on physical inactivity gets lost within wider obesity strategies and therefore promoting physical activity should be a separate and equal concern. This is supported through the comparison of physical inactivity with established risk factors for poor health targeted for government action worldwide. Lee et. al., (2012) estimated that elimination of physical inactivity would increase the life expectancy of the world's

population by 0.68 years. These findings make physical inactivity comparable to the established risk factors of smoking and obesity (Lee, et al., 2012).

1.7 National Physical Activity Interventions

The increased attention on physical activity reflects the Government's recognition of the challenge of improving physical activity levels as a serious public health concern. This increased focus is also demonstrated through the number of national initiatives implemented to improve population health through physical activity.

Exercise referral schemes, which have been introduced to the UK since the 1990's, are an example of a national Government physical activity initiative. Exercise referral schemes involve the referral of patients from primary care into a recognised system with appropriately qualified exercise professionals, to undertake a programme aimed at increasing activity levels (Department of Health, 2001). The number of exercise referral schemes in Britain has grown rapidly since the 1990's and more than six hundred are now thought to be in operation (Pavey et al., 2011). Exercise referral schemes are often delivered within a controlled setting (usually leisure-based) and individuals will typically undergo a prescribed 12-14 week programme (Dugdill, Graham, & McNair, 2005). Evidence for the effectiveness of exercise referral schemes is limited. NICE has previously commented that there was insufficient evidence to support the widespread adoption of exercise referral schemes, and recommended that the UK's National Health Service (NHS) should only make these schemes available as part of a controlled trial (National Institute for Health and Clinical Excellence, 2006). More recently, in a systematic review of eight randomised controlled trials, Pavey et al., (2011) found weak evidence of a short-term increase in physical activity of sedentary individuals after participation in an exercise referral scheme compared with usual care. Similarly, consistent evidence in favour of exercise referral schemes in outcomes based on physical fitness, psychological wellbeing, overall health related quality of life, blood pressure, serum lipid levels, indices of obesity, glycaemic control, or respiratory function was not found. The same review also found no difference in any outcomes when comparing an exercise referral scheme with an alternative physical activity intervention (for example, walking programmes) or with schemes plus an additional behavioural intervention (Pavey, et al., 2011). This appraisal of the evidence-base relating to exercise referral schemes is congruent with recommendations from NICE

(2006) who determined that there was insufficient evidence to recommend the use of exercise referral schemes to promote physical activity, other than as part of research studies where their effectiveness can be evaluated. Therefore, practitioners, policy makers and commissioners should only endorse exercise referral schemes to promote physical activity that are part of a properly designed and controlled research study to determine effectiveness (National Institute of Clinical Excellence, 2006).

In recent years there has been a shift in focus in UK public health policies towards an emphasis on individual lifestyle choices. Reflecting this change, NHS Health Trainers were introduced in disadvantaged communities in England, to provide peer support to individuals at risk of developing lifestyle-related health problems and to aid self-management of behaviour (Department of Health, 2004b). The programme was launched in 2005 in 12 pilot sites and subsequently established in Spearhead Group Primary Care Trusts (the fifth of areas with the worst health and deprivation indicators compared to England) from April 2006 and throughout the country from 2007 (Department of Health, 2004b). Evidence from local evaluations broadly report positive outcomes, suggesting that Health Trainers can provide the necessary support to help individuals make desirable lifestyle change (Ball, O'Kasheh, & Qutishat, 2009; Kime, South, & Lowcock, 2008; Meah & Guest, 2010). Although valuable data is available to assess the process of implementing the initiative there is a paucity of data in the public domain about Health Trainer effectiveness in bringing about health improvement or reducing health inequalities in disadvantaged communities (Attree et al., 2012). Currently, there is a lack of research evaluating the impact of the Health Trainer role, the extent to which it leads to behaviour change and whether it is a cost effective method of promoting lifestyle change (Attree, et al., 2012).

The promotion of walking, as a lifestyle activity, for health improvement has become more popular over the last decade with the implementation of a number of national schemes, such as Walking for Health. Walking for Health was originally launched in 2000 by Natural England. Due to the growing evidence-base relating to the health benefits of short, regular bouts of activity, including walking, in 2007 the Department of Health and Natural England invested in the expansion of the programme as part of a package of public health initiatives aimed at getting people more active in order to benefit their health. Similar to the WTB intervention, a key aim of the Walking for Health expansion was to contribute towards moving sedentary and less active people

(those who achieved at least 30 minutes of moderate intensity physical activity on fewer than three days a week) to a more active lifestyle (three days or more per week). Phillips, Knox and Langley (2012) completed an evaluation examining the impact of the Walking for Health programme and found that it was successful in improving and maintaining levels of physical activity of those who were most sedentary (i.e., a decrease in the proportions conducting no physical activity and an increase in those participating on one or two days per week). However, there was a decrease in the proportion of individuals participating in three or more days of physical activity and this decrease was greater for those in the older age groups (65-74 and 75+) (Phillips, et al., 2012). This therefore provides support for the promotion of walking to encourage the most sedentary to become more active which is of particular relevance to the WTB programme. The promotion of walking as a lifestyle activity for health improvement will be further discussed in Section 2.3.2.

In relation to financial incentives, in 2008, the Government published *'Healthy Weight, Healthy Lives: a Cross Government Strategy for England'* (Department of Health, 2008b) which signalled the intention to introduce financial incentives to promote health. This report stated that incentives such as, payments and vouchers, may be used to encourage individuals to lose weight and sustain that weight loss, to eat more healthily, or to be consistently more physically active. However, the government recognised that at the individual level, there is a need to develop knowledge of the most effective interventions to encourage individuals and families to change behaviours. Despite this, to date, no large scale financial incentive programmes have been implemented in the UK. The current study therefore aims to extend and develop the knowledge-base for the use of incentives in promoting healthy behaviours with a focus on physical activity.

1.8 Summary

There is increased interest in public health interventions aimed at reducing early mortality and morbidity through lifestyle change. There has been a shift of emphasis in healthcare policy away from responding to illness towards preventing onset and minimising the effect of illness by actively promoting lifestyle changes, including regular physical activity. In the context of the present research, this national picture is

also demonstrated in the services delivered by Sandwell PCT's[1] Physical Activity team, where many of the services aim to help people to get active. This pre-supposes that their clients are already sufficiently motivated to become more active in one way or another. As discussed in Chapter 2, there is growing interest in the possibility of using financial incentives to encourage behaviour change in the United Kingdom and some evidence of their effectiveness. This thesis will focus on the use of financial incentives to promote lifestyle physical activity in Sandwell, West Midlands with the aim of engaging sedentary individuals who would not normally be interested in their service provision.

1.9 Aim

To examine the benefits of a scheme offering a financial incentive in combination with a health assessment, pedometer and brief health advice in promoting physical activity, in the area of Sandwell, West Midlands.

1.10 Objectives

1. To determine the impact of a financial incentive on uptake and attendance at a health assessment (through pre- and post-intervention measures).

2. (a) To compare changes in health related behaviour (physical activity) (b) physiological measures of risk, and (c) perceived quality of life from baseline to follow-up.

3. To explore participant experiences, attitudes and motivations towards physical activity, incentivised health schemes and WTB intervention participation.

1.11 Outline of Thesis

Chapter 2 - Literature Review: examines the current evidence-base relating to the use of financial incentives in behaviour change interventions, specifically focusing on

[1] In England, Primary Care Trusts (PCTs) were abolished on 31st March 2013 with responsibilities transferring to the Sandwell and West Birmingham Clinical Commissioning Group (CCG). Sandwell PCT will be referred to throughout this thesis as this body was in place at the time of this research.

physical activity. The literature review, establishes the current evidence-base, contextualises and presents a rationale for this research.

Chapter 3 - Contextualisation and Background to Research: provides a brief introduction to the study area of Sandwell in the West Midlands, and sets the context and rationale for the WTB Project.

Chapter 4 - An Outcome Evaluation of the Walk to Beijing Project: provides detailed information regarding the design of WTB intervention and the methods of investigation, and presents findings from a quantitative outcome evaluation.

Chapter 5 - A Process Evaluation of the Walk to Beijing Project: presents the rationale for using a qualitative research methodology to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health-promotion schemes and this particular intervention. The justification and processes for the methodology used, along with ethical considerations are presented. This chapter then goes on to consider the findings from semi-structured interviews and focus groups.

Chapter 6 - Exploring the Longitudinal Impact of the Walk to Beijing Intervention Participation: A Case-study Analysis. This chapter presents two participant case studies to explore the longer term impact of the WTB intervention at an individual level. The rationale and appropriateness of a mixed methods, case-study approach is presented, before discussion of the findings in the context of relevant literature.

Chapter 7 - Discussion and Conclusions: summarises findings from quantitative and qualitative data presented in Chapters 4, 5 and 6. An evaluation of the research objectives is discussed and consideration is given to the methodological challenges of this research. Future research, recommendations for policy and practice and the implications of this research are considered, with a subsequent commentary on the role of the researcher and a reflective account of the research process.

Chapter 2: Literature Review

2.1 Introduction

This research focuses on the evaluation of a physical activity intervention, 'Walk to Beijing' (WTB), designed, delivered and managed by Sandwell PCT. The WTB programme, described in detail in Chapter 4, used a multi-faceted approach. Central to this was the use of financial incentives, which were offered as part of a programme that included health assessment, brief health advice and pedometers.

The aim of this chapter is to provide further context and a rationale for the WTB approach through reviewing relevant evidence and behaviour change theories, following a brief discussion on physical activity promotion in the UK. Given the key role of financial incentives within WTB, evidence for their use within behaviour change interventions for health improvement (and specifically physical activity), is the focus of a systematic review presented at the end of this chapter (Section 2.6). Evidence relating to the additional intervention components is also considered, with an overview of relevant behaviour change theories which were used to inform the WTB approach and/or help to explain reported findings (Chapters 4-6).

The next section discusses important correlates of physical activity, which often inform the design and targeting of physical activity promotion efforts like WTB when trying to increase physical activity in those most in need of intervention.

2.2 Correlates and Determinants of Physical Activity Behaviour

Understanding the correlates and determinants of physical activity is important in guiding the development of effective interventions. The term 'determinant' is used to reflect the factors that affect, or are thought to affect, participation in physical activity and can be divided into personal and environmental characteristics. The cross-sectional nature of much evidence in this area means that the term 'correlates is often more appropriate to describe the relationship (Bauman, Sallis, Dzewaltowski, & Owen, 2002). As physical activity is affected by diverse factors, several theoretical models

have been used to inform the study of variables which may influence physical activity behaviours (Bauman, et al., 2002).

The following section considers some of the key determinants and correlates of physical activity behaviour. It is beyond the remit of this chapter to provide a comprehensive account of the evidence base for physical activity correlates and determinants; several such reviews have been undertaken, each updating the former in line with current evidence (Bauman et al., 2012; Sallis & Owen, 1999; Trost, Owen, Bauman, Sallis, & Brown, 2002). Rather, a brief overview is provided in the following section to help contextualise the WTB intervention and target group.

2.2.1 Personal Characteristics

Research examining the determinants and correlates of physical activity has identified factors operating at the individual or personal level. There is consistent evidence of overall socio-demographic trends from the UK and elsewhere that men tend to be more active than women and that adult physical activity levels reduce with increasing age (Bauman, et al., 2002). Lower physical activity levels are also observed in lower socio-economic groups and can vary by ethnic group (Bauman, et al., 2002; Department of Health, 2006). In addition to socio-demographic characteristics, certain other biological and psychological attributes have been linked with physical activity.

Individual *stage of change* has been identified as a determinant of physical activity behaviour. The Transtheoretical Model (TTM) of behaviour change and its application to a wide range of health behaviours, including physical activity, has received considerable attention (Prochaska & DiClemente, 1982). The TTM is an integrative model for understanding how people progress toward adopting and maintaining health behaviour change. Core features of the model are the five stages of change and the processes of change, whereby change is achieved by progressing through a series of stages, including precontemplation, contemplation, preparation, action, and maintenance. Processes of change are the strategies people use to progress through the stages. The TTM will be discussed further in Section 2.4.1.

Self-efficacy has also been identified as a key determinant of physical activity behaviour (Section 2.4.1). Self efficacy is an individual's belief in his/her capability of executing the courses of action necessary to satisfy situational demands (Bandura, 1986). Exercise

self-efficacy is the degree of confidence an individual has in his/her ability to be physically active under a number of specific/different circumstances, or in other words, efficacy to overcome barriers to exercise (DuCharme & Brawley, 1995). This is thought to be particularly important in the early stages of exercise. In the early stage of an exercise program, exercise frequency is related to one's general beliefs regarding physical abilities and one's confidence that continuing to exercise in the face of barriers will pay off. Individuals with greater self-efficacy are more likely to adhere to exercise programs with sufficient regularity to reach a point where the behaviour has become, to a certain extent, habitual (McAuley, 1992). Among the psychological correlates of exercise that have been examined, exercise self-efficacy is the strongest and most consistent predictor of exercise behaviour (Section 2.4.1). Research has also aimed to identify the intervention components most effective in changing self efficacy in physical activity interventions. A meta-analysis by Ashford, Edmunds, & French (2010) found that interventions that included feedback on past performance or feedback in comparison to others' performance, and vicarious experience, produced the highest levels of self-efficacy. In contrast, interventions that included persuasion, graded mastery or barrier identification were associated with lower levels of self-efficacy compared with those that did not include these techniques. Similarly, Williams and French (2011) found that 'action planning', 'providing instruction' and 'reinforcing effort towards behaviour' were associated with significantly higher levels of both self-efficacy and physical activity.

Motivation is another important psychological factor in predicting physical activity behaviour. Health, appearance, enjoyment, social interaction, stress relief, challenge, skill development, achievement, and personal satisfaction are among the top motives reported for engaging in regular physical activity (Frederick & Ryan, 1993). Motives differ by gender; for example, females are more likely to say that social factors and release of tension are major benefits of physical activity, whereas males tend to describe the benefits of activity in terms of fitness and health. Motivators for participation in physical activity may also influence people's activity choices. Research has also found that people who participated in individual sports were more motivated by interest and enjoyment whereas those involved in fitness activities were more motivated by physical appearance (Frederick & Ryan, 1993; Salmon, Owen, Crawford, Bauman, & Sallis, 2003).

Exercise history also appears influential in predicting physical activity and exercise behaviours. History of physical activity should positively influence future physical activity behaviour by promoting and shaping self-efficacy for exercise and by developing physical activity skills (Dishman, 1994).

The *health risk profile* of an individual is also related to physical activity behaviour. Health risk behaviours tend to cluster and as a result the health care burden multiplies with the increasing presence of risk factors. Consequently, researchers have been interested in examining relationships between physical activity and other health behaviours, such as smoking, alcohol intake, and diet. For example, data from cross-sectional studies indicate that smokers are less likely to lead physically active lifestyles than non-smokers (Sherwood & Jeffery, 2000). Not only are smokers generally less likely to be physically active, but also less likely to consider making positive changes to exercise patterns or initiate an exercise program (Hooper & Veneziano, 1995). Similarly, An individuals' *body weight* is also a strong correlate of physical activity and a considerable amount of cross-sectional research shows that heavier individuals are less active than lighter individuals (French et al., 1994a). One of the most common reasons individuals give for exercising is weight control, and dieting to control weight is positively associated with frequency of participation in both vigorous and moderate intensity physical activity (French, et al., 1994a). Other determinants of physical activity behaviour include diet (Bauman, et al., 2002) and stress (Schnohr, Kristensen, Prescott, & Scharling, 2005).

The WTB intervention targeted sedentary individuals with use of: financial incentive; health assessment; pedometer; and brief advice. Therefore, the target population could have limited exercise history, associated low self-efficacy, and a health risk profile, which helps to justify the programme design (i.e., using an easily accessible behaviour, additional incentives and the use of a health assessment and brief health advice; Chapter 4).

2.2.2 Environmental and Social Characteristics

If habitual patterns of behaviour are environmentally cued, sustained change is likely to require a supportive environment in which people can be active (Ogilvie, Mitchell,

Mutrie, Petticrew, & Platt, 2008). There is, therefore, increasing interest in the influence of the social and physical environment on physical activity.

Social support is a robust correlate of physical activity. Individuals who engage in regular exercise report more support for activity from people in their home and work environments (Sallis, Hovell, & Richard Hofstetter, 1992; Sternfeld, Ainsworth, & Quesenberry, 1999). In addition, exercise starters are more likely to perceive their families as being supportive of their desire to maintain good health (Hooper & Veneziano, 1995; Kahn et al., 2002). A comprehensive review (Carron, Hausenblas, & Mack, 1996, 2007) concluded that social influence generally had a small-to-moderate effect on physical activity. Effects that were moderate to large were found for (*a*) family support and attitudes about exercise, (*b*) task cohesion, and adherence, (*c*) important others and attitudes about exercise, and (*d*) family support and compliance behaviour. Research has shown that social support interventions can increase levels of physical activity, for example, walking groups and 'buddy systems' can increase time spent engaging in physical activity and frequency of exercise (Kahn, et al., 2002). Studies have also shown that having a spouse and/or supportive family and friends are positively associated with increased physical activity (Sallis, et al., 1992; Sternfeld, et al., 1999).

Time constraints are the most frequent barriers to exercise, reported by both sedentary and active individuals (King, Taylor, Haskell, & DeBusk, 1990; Sherwood & Jeffery, 2000). It has been suggested that as people establish a pattern of adherence to various health-promoting behaviour, less-deliberate decision making about adherence occurs and behaviour becomes more habitual (Maddux, 1993).

It appears that there is a modest relationship between *access* to facilities and physical activity (Wendel-Vos et al., 2008). Access to exercise facilities may be related to exercise levels for some individuals but not for others, depending on activity preference. For those individuals who prefer exercises such as walking or running, access to facilities may be less relevant. Additionally, for those who exercise with home equipment, which could include stationary bikes, treadmills, and even exercise videos, access to facilities may also not affect exercise adherence. Therefore, activities such as walking, which are not facility-dependent, can reduce the risk of access becoming a barrier to physical activity behaviour.

Characteristics of the exercise behaviour itself (e.g. type of exercise, variety, intensity, and duration) are additional important predictors of physical activity (Biddle & Mutrie, 2007). For example, compared with many sports and other recreational activities, walking, the subject of this present research, is a popular, familiar, convenient, and free form of exercise that can be incorporated into everyday life and sustained into old age (Mutrie & Hannah, 2004). One of the appeals of walking is the relative accessibility to all, requiring little skill and with low risk of injury. Walking can be performed at a variety of speeds and intensities, in a group or alone and without the need for any training, special equipment or clothing. It can also be performed in an individuals' own locality and time (Ogilvie, et al., 2007). Walking as a form lifestyle activity is further explored in Section 2.3.2.

This section has briefly considered the correlates and determinants of physical activity, many of which are considered in developing and targeting physical activity interventions. Again, the salient factors discussed help to demonstrate the WTB rationale of using walking as the target behaviour. Section 2.3 will now consider the main types of interventions that have been developed to promote physical activity and to further outline where the WTB intervention and its constituent components fit.

2.3 Physical Activity Promotion

2.3.1 Types of Physical Activity Intervention

Given the increased incidence of sedentary living and the significant risk factors associated with physical inactivity there is a need to develop effective interventions to improve health, which are often targeted at certain groups who may be less active (e.g., lower socio-economic groups, older people, women, overweight/obese, or those with other established health risk factors; Section 2.2). Physical activity can be promoted in a variety of ways and settings (Kahn, et al., 2002). Physical activity is a complex behaviour which can, therefore be influenced through interventions targeted at multiple levels, including the individual-, community-, or population-level (King, 1994). In terms of public health impact, approaches that reach the largest number of people will have the greatest potential impact, but as the scale of intervention increases, the ability to consider differing needs of individuals and population groups is reduced.

Physical activity interventions can be broadly classified into three categories (Heath et al., 2012). *Campaign and informational interventions* generally involve a simple exchange of information to improve knowledge about health promoting physical activity, and potential ways to become active or increase activity. Information can be disseminated at various levels, ranging from individual information provision to national mass media campaigns which have the potential to reach large numbers of the population, such as 'Change4Life' (Department of Health, 2008a). The effectiveness of distributing untailored and general health promotions messages is likely to depend on the recipients existing beliefs, knowledge and attitude towards physical activity. A systematic review by Cavill and Bauman (2004) found that approaches aimed at influencing community norms related to physical activity could increase awareness but not physical activity. However, more recent research has suggested that mass media campaigns can lead to change, especially when they are linked to specific community programmes (Bauman, Smith, Maibach, & Reger-Nash, 2006).

Environmental and policy interventions are based on ecological models of behaviour and aim to create an environment that is conducive to physical activity. Environmental interventions often refer to changes in the physical environment in terms of infrastructure. For example, walking and cycling trails and exercise facilities can be created or enhanced to encourage physical activity and access to existing facilities can be improved with the removal or reduction of structural and environmental barriers (Heath, et al., 2012). Policy interventions often strive to create communities that foster physical activity behaviours, such as policies to increase the costs associated with car travel, ensure the safety of non-car users, and promote town planning to favour pedestrians and cyclists (Bauman, 2005; Trost, et al., 2002). Environmental and policy approaches have the potential for sustainable effects on a large number of people

Behavioural and social approaches to physical activity promotion are most direct. Rather than attempting to effect behaviour change indirectly through education or the environment, behavioural approaches usually target the individual's behaviour. Individually adapted behaviour change programmes are often characterised by a multi-component intervention approach and can aim to encourage lifestyle activity (Heath, et al., 2012). They include interventions such as counselling, personal advice and exercise referral, and can be delivered in a variety of clinical and non-clinical settings (Hillsdon, Foster, Cavill, Crombie, & Naidoo, 2005; Pavey, et al., 2011). This type of intervention

is easier to evaluate given smaller target groups and the ability to monitor individual recipients of the intervention (Schmid, Pratt, & Howze, 1995). Also unlike campaigns and informational approaches and environmental interventions, they can be targeted and tailored to the individual, and are easier to implement than changing the physical environment. However, the public health impact and sustainability of behaviour change that may result from such approaches may be limited in comparison to environmental approaches (Sallis et al., 2009).

As detailed in Chapter 4, the WTB intervention falls within the 'behavioural and social approaches' category, targeting individuals and communities to increase lifestyle activity through walking. The following section presents information relating to types of physical activity intervention relevant to the WTB approach: lifestyle physical activity interventions (Section 2.3.2) and physical activity interventions delivered in community settings (Section 2.3.3). Section 2.4 will then go on to discuss relevant theoretical models relevant to this research.

2.3.2 Interventions to promote Lifestyle Physical Activity

Of particular relevance to the present research and physical activity promotion in general is how to engage individuals who are sedentary. One approach is to encourage the incorporation of physical activity into an individual's daily life. Current recommendations for physical activity emphasise "lifestyle physical activity…the daily accumulation of 30 minutes of self-selected activities, which includes all leisure, occupational, or household activities that are at least moderate to vigorous in their intensity, and could be planned or unplanned activities, that are a part of daily life" (p. 399) (Dunn, et al., 1998). Therefore, lifestyle physical activity interventions focus on increasing moderate intensity activity while attempting to take into account individual, cultural, and environmental differences. Evidence for the effectiveness of lifestyle physical activity interventions has been demonstrated in a number of studies. For example, Dunn, Marcus, Kampert, Garcia, Kohl and Blair (1999) found that in previously sedentary healthy adults, a lifestyle physical activity intervention was as effective as a structured exercise program in improving physical activity, cardio-respiratory fitness and blood pressure. The project ACTIVE trial (Sevick et al., 2000) found that a behaviourally based lifestyle intervention approach in which participants are taught behavioural skills to increase their physical activity by

integrating it into their daily lives was more cost effective than a structured exercise programme in improving physical activity and cardio-respiratory health in sedentary adults.

In addition to the lifestyle physical activity approach, evidence from two systematic reviews by Dunn, Andersen and Jakicic (1998) and Hillsdon and Thorogood (1996), suggested that interventions based on theories of behaviour change, which teach behavioural skills and are tailored to individual needs, have also been associated with longer-term changes in behaviour than interventions without a theoretical base. Finally, interventions that promote moderate intensity physical activity, particularly walking, and are not facility dependent, have been linked with longer-term changes in behaviour (Hillsdon, Foster, Naidoo, & Crombie, 2004).

Promoting walking as a lifestyle activity within public health interventions is particularly promising given its widespread acceptability and accessibility, particularly among populations with a low prevalence of physical activity (Morris & Hardman, 1997). Further, walking is a common, accessible, inexpensive form of physical activity and is an important component of total physical activity in adult populations (Hallal et al., 2012a). Walking is an aerobic activity which utilises large skeletal muscle movements and can produce the various health benefits of physical activity with few adverse consequences (Morris & Hardman, 1997). Walking-related interventions have been implemented to improve population levels of activity and evidence has supported the effectiveness of this activity (Ogilvie, et al., 2007).

It is perhaps not surprising, therefore, that there has been a shift in focus towards promoting moderate lifestyle physical activities, such as walking (Section 1.7). Brisk walking at a speed of 3 to 4 miles per hour is roughly equivalent to an intensity of 3 to 6 METS (work metabolic rate/resting metabolic rate): i.e., moderate intensity physical activity (Ainsworth, et al., 2011). Large scale longitudinal studies and randomised controlled trials have reported the efficacy of walking as a particular form of lifestyle physical activity which can garner health protective benefits in terms of cardiovascular fitness, reductions body weight, BMI, body fat and decrease in resting diastolic blood pressure (Murphy, Nevill, Murtagh, & Holder, 2007).

It is this rationale on which the WTB approach was based; i.e., aiming to promote lifestyle physical activity through walking (described in Chapter 4). The next chapter

will consider the effectiveness of delivering such physical activity interventions in community settings.

2.3.3 Physical Activity Interventions in Community Settings

Physical activity interventions delivered in community settings are also relevant to the current research. The WTB intervention was delivered in various community settings and used competition between towns to encourage participation (Section 4.2.4).

Community settings are those where participants are not recruited via a specific setting such as a general practice, a hospital department or workplace, and may include the home, fitness, leisure or sports facilities and community facilities such as libraries, church halls and community centres. Within community settings, review level evidence suggests that interventions targeting individuals are effective in producing short-term changes in physical activity, and are likely to be effective in producing mid- to long-term changes in physical activity (Hillsdon, et al., 2005). Two reviews provided this evidence (Dunn, et al., 1998; Hillsdon & Thorogood, 1996), incorporating 13 experimental studies. Effective interventions, delivered in community settings, were identified as including: recruitment via advertisement in the local press or randomised telephone survey; encouragement of exercise that can be taken from the home (i.e., walking); written materials sent by post that provide education and guidance on starting and maintaining an exercise programme; self-monitoring via logbooks; and on-going support via the telephone (Hillsdon, et al., 2005). These intervention components are consistent with evidence gathered from the application of a number of behaviour change theories and frameworks, which will be discussed further in Section 2.4. In addition, intervention components, such as self-monitoring and ongoing support, highlight the potential importance of tailoring physical activity interventions to the individual.

2.4 Theoretical Framework: Models of Behaviour Change and Theories of Motivation

It has been argued that interventions aimed at achieving behaviour change should be developed from a sound evidence-based theoretical structure (Michie & Abraham, 2004). Theory based interventions can provide an explanation of how an intervention

works, developing an understanding of the causal processes and mechanisms which account for observed behaviour change. In addition, theoretical models can inform the selection of appropriate intervention evaluation measures. This section describes theoretical models of behaviour change and theories of motivation relevant to this research, including: the Transtheoretical Model of Behaviour Change (TTM) (Prochaska & DiClemente, 1982); the Theory of Planned Behaviour (TPB) (Ajzen, 1991); Cognitive Evaluation Theory (CET) (Deci & Ryan, 1985); and the Social Determination Theory (SDT) (Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991).

2.4.1 Stage-Based Theory: The Transtheoretical Model of Behaviour Change

The TTM is the most widely used stage model in physical activity research and its theoretical framework has been applied to a range of different behaviours including: tobacco use (Spencer, Pagell, Hallion, & Adams, 2002); sexually transmitted diseases (STD) and pregnancy prevention (Horowitz, 2003); cancer screening behaviour (Spencer, Pagell, & Adams, 2005); addictive substances (Migneault, Adams, & Read, 2005; Velasquez, von Sternberg, Dodrill, Kan, & Parsons, 2005); and dietary habits (Salmela, Poskiparta, Kasila, Vähäsarja, & Vanhala, 2009; Spencer, Wharton, Moyle, & Adams, 2007). The model has gained widespread popularity amongst practitioners, clinicians and researchers and is being used to guide intervention design and allocate treatment resources in health promotion (Littell & Girvin, 2002).

The TTM is an integrative model for understanding how people progress towards adopting and maintaining health behaviour change. This model suggests that individuals attempting to change a health behaviour move through a series of stages of readiness for change: “precontemplation” (no intention to change behaviour in the next six months); “contemplation” (intention to change in the next six months); “preparation” (intention to change in the immediate future); “action” (actively engaging in behaviour change, but for less than six months); and “maintenance” (robust behaviour change extending beyond six months). Movement through these stages often occurs in a cyclical, rather than linear, pattern as several attempts may be made to change behaviour before reaching the end goal (Marcus, Simkin, Rossi, & Pinto, 1996).

In addition to these core components, the TTM proposes that there are ten processes of change which attempt to explain and understand how individuals change their behaviour (Prochaska, Velicer, Diclemente, & Fava, 1988). Processes of change are the covert and overt activities that people use to overcome the barriers they encounter at particular stages, and thus progress towards their desired end state. They are classified as either 'Experiential Processes', which are used primarily for the early stage transitions, or 'Behavioural Processes', which are used primarily for later stage transitions. In this respect, the processes represent a set of independent variables that individuals employ when changing their behaviour. Table 1 describes the ten behavioural processes involved in progressing through the different stages of the TTM and an example relating to physical activity is provided to illustrate each process of change.

Table 1. *TTM processes of change*

Processes of Change	**Description**	**Example**
Experiential Processes		
Consciousness Raising	Efforts made by the individual to seek new information, increasing awareness and understanding of the causes, consequences and cures for a particular problem behaviour.	Finding and learning new facts, ideas, and tips that support participation in physical activity.
Dramatic Relief	A process of change initially produces increased emotional experiences followed by reduced affect if appropriate action can be taken.	Experiencing the negative emotions that go along with the risks of being physically inactive.
Environmental Re-evaluation	Combines both affective and cognitive assessments of how the presence or absence of a personal habit affects an individuals' social environment.	Realising the negative impact of being physically inactive or the positive impact of being physically active on proximal social and physical environments.
Social Liberation	Awareness, availability, and acceptance by the individual of alternative, problem-free lifestyles. It involves experiencing an increase in social / environmental	This may involve realising that social norms are changing in the direction of supporting physical activity, such as, "I now have easier access to physical activity

	opportunities or alternatives.	facilities in my local area".
Self Re-evaluation	Combines both cognitive and affective assessments of an individual's self-image with and without a particular unhealthy habit. This involves realising that physical activity is an important part of personal identity.	Assessment of physical activity related values, such as, an image as a 'couch-potato' or an 'active person', e.g., "being inactive makes me feel disappointed in myself".
Behavioural Processes		
Stimulus Control (Re-engineering)	The removal of cues for unhealthy habits and the addition of prompts for healthier alternatives.	The use of posters as prompts to encourage stair use in the workplace.
Helping Relationship	Trusting, accepting and using the support of caring others during attempts to change behaviour.	The creation of a 'buddy' system for the provision of social support in physical activity participation, e.g., "I have a friend that will walk around the park with me".
Counter-Conditioning	The learning of healthier behaviours that can substitute problem behaviours.	Substitution of sedentary behaviour with physical activity, e.g., "I find that walking to the shops at lunch time when at work is a good substitute for ordering food in".
Reinforcement Management (Rewarding)	Rewarding oneself or being rewarded by others for making changes / contingency contracts, overt and covert reinforcement, self-reward.	Rewarding oneself for engaging in physical activity and changing the contingencies related to not engaging in physical activity, e.g., "I reward myself when I go to the gym".
Self-Liberation	Choosing and making a commitment to change, believing in one's ability to change/control behaviours.	Making commitments to be physically active, e.g., "I will take part in an exercise class every Tuesday".

There are a number of additional variables that have been postulated to be important during behaviour change within the TTM, including decisional balance (Herrick, Stone, & Mettler, 1997) and self-efficacy (Marcus, Eaton, Rossi, & Harlow, 1994). Decisional

balance relates to a person's perception of benefits (pros) compared to negative aspects (cons) associated with the behaviour change (Marcus & Owen, 1992). For example, some people may recognise the pros of participating in physical activity such as higher fitness levels, while others are more likely to consider the negative aspects of physical activity such as having limited time. These two dimensions have been consistently supported by studies across many different problem behaviours in TTM-based research (Marcus, et al., 1994). Characteristically, the 'pros' of healthy behaviour are low in the early stages and increase across the stages of change, and the 'cons' of the healthy behaviour are high in the early stages and decrease across the stages of change (Marcus & Owen, 1992). The self-efficacy construct was adapted from Bandura's self-efficacy theory (Bandura, 1977, 1986) and is described in Section 2.2.1.

An advantage of the TTM is that it aims to understand behaviour change as a process and attempts to explain *how*, rather than *why*, behaviour change occurs. It takes a pragmatic approach and offers explicit suggestions of how to help people successfully change their behaviour. In relation to exercise and physical activity, research has shown that individuals can easily be 'staged' for physical activity and that physical activity stage is related to physical activity level (Laforge, Velicer, Richmond, & Owen, 1999; Marshall & Biddle, 2001). Therefore, assessing stage of change for physical activity can provide useful descriptive information and can inform targeted health promotion interventions. Research demonstrates that in order for an intervention based on the TTM to be effective it must be targeted to the individual's stage of behaviour change. For example, Marcus, Bock, Pinto, Forsyth, Roberts, and Traficante (1998) conducted a randomised controlled trial in which sedentary participants were randomly assigned to a tailored intervention group or a comparison group consisting of standard treatment (materials were not targeted or tailored). The intervention group was administered stage-matched manuals (i.e., targeted intervention materials) and individualised advice and feedback based on participants' responses to constructs believed to be important for behaviour change (i.e., self-efficacy, weighing the pros and cons of physical activity, behavioural and cognitive processes of change). The intervention phase of the study included mailed assessments and intervention materials at baseline, one-, three-, and six-months. Participants in the intervention group significantly increased the number of minutes of physical activity completed per week and were more likely to achieve the government's recommended level of physical activity than the comparison group.

Improvements were also maintained six months post-intervention (at month 12) (Bock, Marcus, Pinto, & Forsyth, 2001).

The TTM (Prochaska & DiClemente, 1992) offers a dynamic advance on the static models of behaviour change and provides an appropriate and intuitively plausible framework for understanding behaviour. This model has been successfully used in other health settings, which lends confidence to its application to physical activity interventions (Marshall & Biddle, 2001).

In the context of the present research, Sandwell PCT were motivated to engage individuals in the precontemplation, contemplation and preparation stages of the TTM, and encourage participants to progress to the next stage. The TTM model was used to inform the WTB intervention evaluation and stage of change was selected as an outcome measure as stipulated by Sandwell PCT. It was selected because it allowed for an appropriate classification of participants into activity groups (i.e., regularly active and not regularly active) and could offer an understanding of the processes individuals employ when changing their physical activity behaviour.

2.4.2 Attitude-Based Theory: Theory of Planned Behaviour

In addition to the TTM, the Theory of Planned Behaviour (TPB) (Ajzen, 1991) is considered a useful theory to study the cognitive determinants of behaviour. The central premise is that intention is a key predictor of behaviour in a wide range of health domains, including physical activity (Figure 1) (Armitage & Conner, 2001; Godin & Kok, 1996; Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997; McEachan, Conner, Taylor, & Lawton, 2011).

The TPB is an extension of the Theory of Reasoned Action (TRA) (Ajzen & Fishbein, 1980) and specifies the factors that determine an individual's decision to perform a particular behaviour. It proposes that the key determinants of behaviour are intention to engage in that behaviour and perceived behavioural control over that behaviour. Within this model, intentions represent an individual's motivation, conscious plan or decision to exert effort to perform a behaviour (Abraham, Conner, Jones, & O'Connor, 2008).

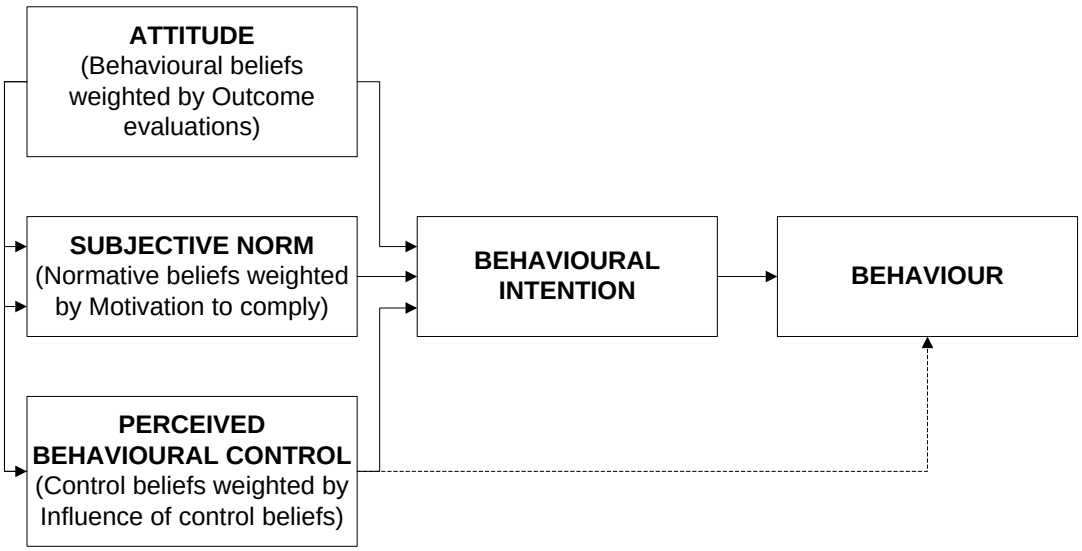

Figure 1. *The Theory of Planned Behaviour (TPB) (Ajzen, 1991). Source: adapted from Azjen (2006)*

Central to the TPB is the idea that the performance of any behaviour is co-determined by behavioural intention and perceived behavioural control. Behavioural intentions are representations of people's plans of action and summarise people's motivation to engage in behaviour; thus, the more motivated people are to engage in the behaviour, the more likely will be its successful performance. Perceived behavioural control reflects people's confidence in their ability to carry out a particular behaviour and is regarded as being synonymous with Bandura's (1977) self-efficacy construct (e.g., (Ajzen, 1991; Ajzen & Driver, 1992) (described in Section 2.2.1). Behavioural intention, in the TPB, is assumed to be determined by three independent constructs: attitudes (positive–negative evaluations of the behaviour); subjective norms (perceived social pressure to perform the behaviour); and perceived behavioural control. In general, individuals are more likely to participate in physical activity if they are positively disposed toward it (attitude), if they perceive social pressure to do so (subjective norm), and if they believe the behaviour is achievable (perceived behavioural control) (Armitage, 2005).

However, the relative importance of attitude, subjective norm, and perceived behavioural control in the prediction of intention is expected to vary across behaviours and situations' (Ajzen, 1991). A meta-analysis confirmed that intention was most strongly predicted by overall attitude with perceived behavioural control also making a major contribution; subjective norm explained notably less variance (Downs &

Hausenblas, 2005; Hagger, et al., 2002). Downs and Hausenblas (2005) also found that intention and perceived behavioural control make unique contributions to the variance of physical activity behaviours.

One criticism of the TPB is that it is a unidirectional model which predicts behaviour from measures of intention taken at one point in time. Furthermore, the model relies solely on cognitions and thereby omits other potentially important determinants of action, such as environmental influences. Moreover, the TPB investigates the interrelationships between constructs of the model and a single behaviour, it does not account for alternative behaviours (Biddle & Mutrie, 2007).

2.4.3 Control-Based Theories: Social Determination Theory and Cognitive Evaluation Theory

Within the literature, numerous references are made to the fact that changes in physical activity and health behaviours are thought to be associated with the need to 'take control' of personal lifestyles (Biddle & Mutrie, 2007). Similarly, research examining processes related to intrinsic motivation has explored the notion of perceived control in explaining variations in motivation and behaviour. This section will consider a number of control-based theories relating to motivation and behaviour change.

Social Determination Theory

The Social Determination Theory (SDT) (Deci & Ryan, 1985; Deci, et al., 1991) is a popular control-based theory in exercise and sport psychology. The theory is built on earlier work concerning intrinsic and extrinsic motivation (Vallerand, 2007).

A fundamental feature of the SDT is that human behaviour is guided by three innate psychological needs, including autonomy, competence and relatedness. The need for autonomy is related to the desire of individuals to choose their actions and feel that their behaviour is self-endorsed. The need for competence reflects individuals' tendency to feel efficient and effective, and to experience opportunities for the mastery of their environment. The need for relatedness refers to the desire to feel connected with others, treated with sensitivity, cared for, and supported by significant others (Deci & Ryan, 2000; Ryan & Deci, 2000b). The SDT offers a comprehensive approach to studying health behaviour through its conceptualisation and measurement of autonomy,

perceived competence, relatedness to others, and its emphasis on the role of the social context in supporting or undermining optimal motivation (Patrick & Williams, 2012).

Traditionally, theories of motivation have made a distinction between intrinsic and extrinsic motivation. Intrinsic motivation is characterised by engaging in behaviours for inherent satisfactions (e.g., fun, challenge and enjoyment) while extrinsic motivation is characterised by engaging in behaviours for some separable consequence, whether this comes in the form of tangible rewards, social acceptance, proving something to oneself, or maintaining consistency between one's values and one's behaviours (Ryan & Deci, 2000b). The basic psychological needs of competence, autonomy and relatedness identified by the SDT can contribute to predicting how and in which circumstances intrinsic motivation can be promoted (Biddle & Mutrie, 2007; Vallerand, 2007).

A growing body of research has applied SDT in studies of health-related behaviour change (Patrick & Williams, 2012; Ryan, Patrick, Deci, & Williams, 2008). Health researchers, such as Rothman (2000), have described the process of health behaviour change as entailing the dual tasks of initiating and maintaining change. The SDT is focused on the processes through which a person obtains the motivation for initiating new health-related behaviours and maintaining them over time (Ryan, et al., 2008). SDT argues that developing a sense of autonomy and competence are critical to the processes of internalisation and integration, through which a person comes to self-regulate and sustain behaviours conducive to health and well-being.

Cognitive Evaluation Theory

Cognitive Evaluation Theory (CET) (Deci, 1975; Deci & Ryan, 1985) involves the processing of information concerning reward structures and distinguishes between intrinsic and extrinsic motivation for physical activity. Thus, it remains a feasible theory for the study of motivational process in physical activity behaviour.

CET was developed by Deci and Ryan (Deci & Ryan, 1985) to identify the immediate contextual conditions that either support or undermine the needs for competence and autonomy and postulated that variations in individuals' experience of these constructs will produce variability in intrinsic motivation (Biddle & Mutrie, 2007). CET, a sub-theory of SDT, suggests that interpersonal events and structures (e.g., rewards, communications and feedback) that are conducive with feelings of competence during action can enhance intrinsic motivation for that action because they allow satisfaction of

the basic psychological need for competence. However, CET further specifies that feelings of competence will not enhance intrinsic motivation without an accompanying sense of autonomy. In other words, individuals must satisfy the psychological needs of both competence and autonomy (i.e. self-determined) in order to experience high levels of intrinsic motivation and for this motivation to be maintained. This therefore influences the potential effectiveness of the use of extrinsic rewards for health-behaviours such as physical activity (e.g., financial incentives). The CET has implications for the current research as the use of an extrinsic reward in the form of a financial incentive is a central component of the WTB intervention. The potential impact of extrinsic rewards on motivation will be discussed here briefly before detailed consideration of the use of financial incentives in physical activity promotion is presented in Section 2.6.

Previous research has identified an 'over-justification effect' (Deci & Ryan, 1985) from the use of extrinsic rewards. This refers to the concept that by rewarding individuals for engaging in an intrinsically interesting activity, there is a subsequent reduction in involvement in this activity when the reward is no longer obtainable. This over-justification effect is based on the premise that the behaviour would have occurred anyway without the extrinsic reward. However, the presence of an expected reward causes a shift in perceptions from intrinsic to extrinsic and the behaviour is engaged in for reasons of receiving a reward rather than for intrinsic value. The resulting shift in perceived locus of causality means that the reward 'over-justifies' the behaviour and, in the absence of the reward, a reduction in intrinsic motivation in demonstrated (Biddle & Mutrie, 2007). The CET proposes that extrinsic rewards need not be detrimental to intrinsic motivation in all situations and that rewards are likely to serve two functions. The first is that a reward can serve an information function which may enhance intrinsic motivation when appropriate rewards provide information about the individuals' competence. Extrinsic rewards can also serve a controlling function. If the reward is perceived to be controlling behaviour (i.e., the goal is to achieve the reward rather than engage in a behaviour for intrinsic reasons) then removal of the reward is likely to lead to a subsequent deterioration of intrinsic motivation.

Within CET, Deci and Ryan (1985) proposed ways in which different reward structures may influence intrinsic motivation in exercise settings (Figure 2).

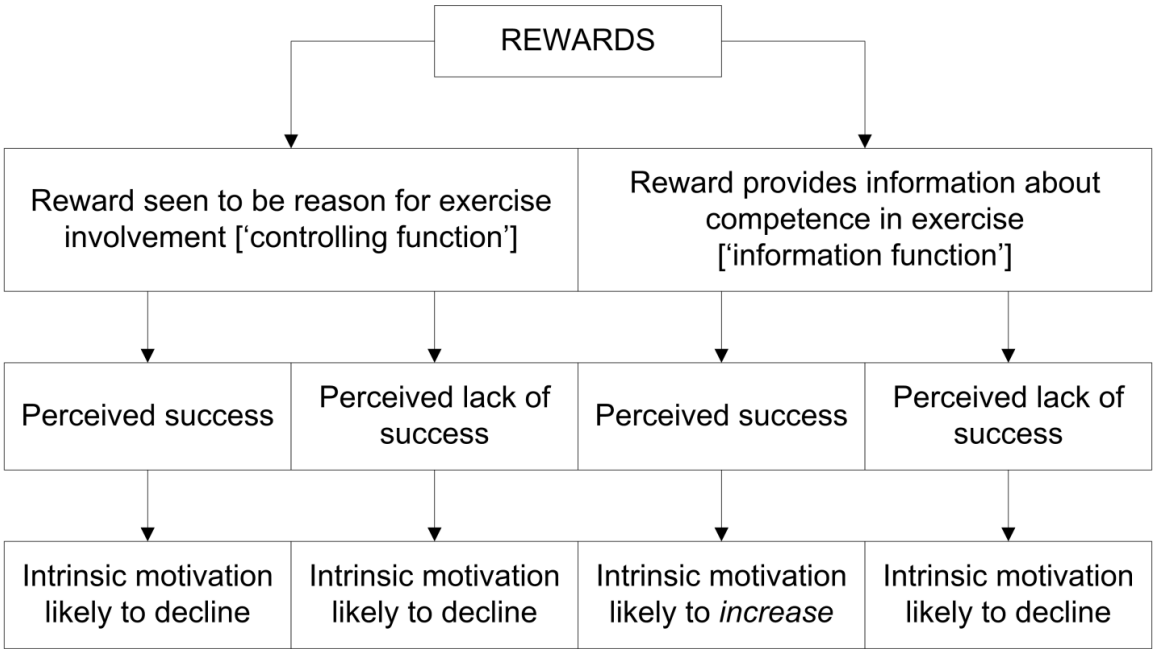

Figure 2. *Proposed links between reward structures and intrinsic motivation in exercise settings (Biddle & Mutrie, 2007)*

Therefore extrinsic rewards may have both enhancing and undermining effects on intrinsic motivation depending on the context in which they are presented. Several studies have provided evidence to suggest that extrinsic rewards undermine intrinsic motivation. For example, a meta-analysis conducted by Deci, Koestner, & Ryan (1999), found that performance-contingent rewards increase extrinsic motivation while the contingency is present, but at the expense of decreasing intrinsic motivation once removed. The explanation for this finding is that external rewards are often experienced as subtly controlling and therefore undermine autonomous motivation and this maintenance of behaviour once removed. In contrast, studies have also shown the effectiveness of extrinsic rewards in encouraging individuals to initiate healthy behaviours (Volpp et al., 2009). In addition, evidence for the short term effectiveness of financial incentives is strongest in drug misuse programmes (Lussier, Heil, Mongeon, Badger, & Higgins, 2006). A number of studies have also recently demonstrated that offering small extrinsic rewards, in the form of financial incentives, increase enrolment and reduce disparities by encouraging otherwise underrepresented groups to participate in both physical activity and weight loss interventions, thereby enhancing intervention reach (Almeida, Shetterly, Smith-Ray, & Estabrooks, 2010; Mutrie, Foster, Estabrooks, Burton, & Baker, 2010).

A number of theoretical frameworks that have been used to underpin behaviour change interventions have been presented, with a focus on those most relevant to the current research. Now that the context in terms of overall approaches to relevant behavioural and social physical activity interventions has been provided, the following section describes evidence relating to specific components of the WTB intervention.

2.5 Evidence relating to Walk to Beijing Intervention Components

Interventions to change health-related behaviours are usually complex, comprising many and often interacting components (Craig et al., 2008); as noted earlier, WTB combined financial incentives with pedometers, health assessments and brief advice. Michie et al., (2011) developed a taxonomy of behaviour change techniques in order to describe various components and strategies of interventions to promote physical activity and healthy eating behaviours. Michie, Abraham, Whittington and McAteer (2009) conducted a meta-regression analysis to identify effective techniques, classified according to change techniques and theoretically derived technique combinations (Michie, et al., 2011), in physical activity interventions. Those including self-monitoring and at least one of four other self-regulatory techniques derived from control theory (Carver & Scheier, 1981, 1982) (i.e., prompt intention formation, prompt specific goal setting, provide feedback on performance and prompt review of behavioural goals) were significantly more effective than interventions not including these techniques. Greaves et al., (2011) also conducted a systematic review of reviews of intervention components associated with increased effectiveness in dietary and physical activity interventions. They found that intervention effectiveness was increased by engaging social support, targeting both physical activity and healthy eating, and using well-defined behaviour change techniques. Increased effectiveness was also associated with increased frequency of contacts and using self-regulatory behaviour change techniques, such as goal setting and self-monitoring (Greaves, et al., 2011).

The WTB intervention comprised a financial incentive (central component) combined with a health assessment, pedometer and brief health advice. The use of these components in physical activity interventions are now discussed in turn.

2.5.1 Pedometer-based Interventions

Pedometers are physical activity monitors that can be used for both measurement and intervention. They are small devices, usually worn on the hip, which record and display the number of steps taken. Pedometers have good validity for measuring moderate-intensity activity under controlled laboratory conditions (Crouter, Schneider, Karabulut, & Bassett, 2003) and free living conditions (Schneider, Crouter, & Bassett, 2004). They are also used to promote walking as a lifestyle activity, in addition to providing simple, objective measures of walking, which can facilitate goal setting and self-monitoring achievement towards a certain goal (Tudor-Locke, Williams, Reis, & Pluto, 2002b, 2004).

Review level evidence suggests that pedometer use is associated with significant increases in physical activity, equating to approximately 2,000 steps or one mile per day (Bravata et al., 2007), and may be associated with clinically relevant reductions in weight and systolic blood pressure (Bravata, et al., 2007). Ogilvie et al., (2007) conducted a systematic review of interventions to promote walking and found that pedometers, coupled with various supporting measures, formed a central component of seven studies (six randomised controlled trials, RCT). Three of these studies demonstrated a significant net increase in self-reported walking or in step-counts at three-month follow-up. This was replicated at follow-ups of between 14 and 16 weeks, however, the significant net increase in step counts was not sustained at 24 weeks (Ogilvie, et al., 2007). In 2006, a NICE review of four pedometer-based intervention studies suggested that addressing social and cognitive factors via a support structure, is required for a pedometer-based intervention to be effective (Talbot, Gaines, Huynh, & Metter, 2003; Tudor-Locke et al., 2003). A physical activity consultation, based on a theoretically grounded framework, constitutes one method of addressing these factors that has been demonstrated to effectively promote physical activity (Kahn, et al., 2002). Researchers have suggested that pedometers may provide an important discussion point for in-depth physical activity consultations (Stovitz, VanWormer, Center, & Bremer, 2005) yet this is an area that has not been well addressed in pedometer-based intervention studies (Baker et al., 2008). Overall, there is evidence that pedometers may be useful motivational tools for increasing walking as a form of lifestyle physical activity, especially if accompanied by other components based on behaviour change theories (Section 2.4). The WTB intervention used pedometers in combination with repeated health assessments which are further discussed in the next section.

2.5.2 Health Checks, Health Assessments and Physical Activity Consultations

Health checks, health assessments and consultations have been used in physical activity promotion and delivered in clinical and non-clinical, community settings. Health assessments can be employed as components of behavioural and social interventions to promote physical activity through identifying a health motive (e.g., high blood pressure) to change behaviour (Section 2.2.1), and providing an opportunity or platform to engage in a discussion around lifestyle.

Health assessments delivered in non-clinical, community settings, such as, worksites, community centres, recreational and leisure facilities are considered here as they are most relevant to the intervention under investigation. For example, Jeffery et al., (1998) used personal trainers to deliver behaviour based sessions in community settings with a telephone follow-up, and financial incentives to reinforce behaviour. Strategies used in interventions that use health checks or health assessments as a vehicle for behaviour change often include techniques, such as motivational interviewing. Consequently, the ability and skills of the individual delivering intervention becomes hugely influential (Miller & Rollnick, 2002). Evidence for the effectiveness of provider-based physical activity counselling is equivocal which has led researchers to conclude that sufficient evidence is not available to recommend this approach as a single-component intervention (Eden, Orleans, Mulrow, Pender, & Teutsch, 2002).

As described in Chapter 4, Section 4.2.4, the WTB health assessment was conducted by trained physical activity and exercise professionals and delivered in non-clinical settings (easily accessible, community locations e.g., libraries, community centres/events). As noted earlier, this aimed not only to raise health awareness (providing health motive), but provided an opportunity to engage Sandwell residents in discussions around health and lifestyle; i.e., for a brief intervention.

2.5.3 Brief, Tailored Physical Activity Interventions

Evidence from a 2006 NICE review of brief, opportunistic interventions in primary care settings (from basic advice to more extended, individually focused discussions) was indicative of moderate increases in physical activity in middle aged and older recipients in the short term, with some studies showing longer term benefits (NICE, 2006). The subsequent recommendation was that practitioners should consider individual's 'needs,

preferences and circumstances', agree goals, provide written information and follow participants up for three- to six-months (NICE, 2006).

With a specific focus on walking, Ogilvie et al. (2007) found six studies (five RCTs) reporting the effects of brief advice given face-to-face either in the workplace, by clinicians, or an exercise specialist in primary care. A significant net increase in self-reported walking was found in studies with follow-up periods of up to six weeks, however, this increase was not observed in two of the four studies with longer follow-up.

Individually-adapted health behaviour change programmes are also often tailored to the individual's readiness to change, specific interests and preferences (Kahn, et al., 2002). Riemsma et al., (2002) reviewed the effectiveness of interventions based on a stages of change approach to promote individual behaviour change. One of the seven trials aimed at the promotion of physical activity did not report any data on behaviour change; three found no significant differences between groups in behavioural change outcomes; two showed mixed effects; and one trial mainly showed significant effects in favour of the stage-based intervention. However, Hillsdon et al., (2005) presented evidence in a review of reviews that interventions based on theories of behaviour change, which teach behavioural skills and are tailored to individual needs, are associated with longer-term changes in behaviour than interventions without a theoretical base. Therefore, evidence is mixed in relation to the effectiveness of tailoring brief interventions using a stage-of-change approach.

This evidence further adds to the overall suggestion that behavioural and social physical activity interventions are more effective if they are multi-faceted (not single component) and their design is informed by theories of behaviour change (Section 2.3)

2.5.4 Financial Incentives

The use of financial incentives was the central component in the WTB approach. Health related behaviours and the factors shaping their adoption are complex. Simply telling people what is good for their health is not an effective strategy for producing sustainable behaviour change (Department of Health, 1996). There is growing interest in the possibility that providing direct incentives can encourage individuals to adopt healthy lifestyle behaviours. This interest is driven by long term policy concern that improving

population health in part depends on the willingness, and ability of individuals to choose health enhancing behaviours (Department of Health, 1996). A financial incentive, defined as a monetary transfer (either in-cash or in-kind) can be provided directly to an individual with the intention of inducing behaviour change.

According to Michie et al's., (2011) behaviour change taxonomy, financial incentives or rewards can be used in several ways. Firstly, an individual can use praise or rewards for attempts at achieving a particular behavioural goal. This technique was labelled 'prompt rewards contingent on effort or progress towards behaviour' (Abraham & Michie, 2008). It may include efforts to achieve the behaviour or progress in preparatory steps towards the behaviour, but not merely participation in intervention and can also include self-reward. Secondly, a financial incentive can be used to reinforce successful performance of the specific target behaviour; in this instance the provision of the reward was contingent on successful behaviour. This may include praise and encouragement as well as material rewards but the reward/incentive must be explicitly linked to the achievement of the specific target behaviour; i.e. the person receives the reward if they perform the specified behaviour but not if they do not perform the behaviour (Abraham & Michie, 2008). Within physical activity interventions the provision of incentives for being more physically active are not instances of this technique unless information about contingency to the performance of the target behaviour is provided. The provision of rewards for completing intervention components or materials is not an example of this technique (Abraham & Michie, 2008). Thirdly, according to Michie et al., (2011), financial incentives or rewards can be used in 'shaping'. In this technique, contingent rewards are first provided for any approximation to the target behaviour (e.g., any physical activity increase), and, subsequently, only a more demanding performance would be rewarded. This technique therefore employs a graded use of contingent rewards over time (Abraham & Michie, 2008).

Research from outside the UK has suggested that financial incentives can help to engage sedentary individuals and promote participation in physical activity. For example, Puska, Isokääntä, Korpelainen and Vartianen (1999) implemented an innovative method for lowering population cholesterol in North Karelia, Finland. In the 1970's Karelia had one of the highest rates of heart disease in the world. The method employed involved creating a competitive environment between small villages to see which could reduce the average village cholesterol levels the most over a two-month

period with a £1,500 financial incentive. There were two competitions, in 1991 and 1997; in 1991 seven villages participated with a total population of approximately 1000. The mean cholesterol level was reduced in six of the seven villages, by a mean of 5.8% and the winning village had a mean cholesterol reduction of 11%. In 1997, 16 villages participated with a total population of 2,685. The mean reduction in all villages was 9% and the winning village had a mean cholesterol reduction of 16%. The most successful villages had organised more self-help groups and activities to inform villagers and encourage making and sustaining changes to their diet. Delivering such an intervention through community activity was both feasible and successful as it harnessed competition. The logic behind such a community approach is that larger numbers of people can be reached, including the most sedentary, compared with the individual-orientated approaches often used in health care settings (Sherwood &, Jeffrey, 2001). The use of financial incentives and the employment of a community approach were of particular interest to the present research.

A growing body of research has also investigated the use of financial incentives across a variety of health behaviours with varying results. For example, Volpp, et al., (2008), John, et al., (2011) and Paul-Ebhohimhen and Avenell (2007) have investigated the use of financial incentives in weight-loss programmes and in treatments for overweight and obese individuals. Volpp, et al., (2008) demonstrated that a low-intensity intervention, coupled with the use of small financial incentives, can produce significant weight loss during a 16-week intervention, however, this was not fully sustained (at three-months post-intervention). To date, less attention has focused on the issue of weight and health behaviour change maintenance after financial incentives are removed. However, this study demonstrated the potential usefulness of financial incentives in keeping participants engaged in the intervention as lost to follow-up rates were lower than typical in weight loss programmes (Volpp, et al., 2008). John et al., (2011) attempted to expand this literature by evaluating a longer term (32-week) weight loss intervention using a randomised controlled trial. Incentive participants lost more weight than control participants during the weight loss intervention. However, follow-up data 36-weeks after the 32-week intervention had ended indicated weight regain; the net weight loss between the incentive and control group was no longer significant. This study demonstrated that financial incentives were effective in encouraging weight loss up to 32-weeks, but this was not maintained when the incentive was removed. This highlights the need to consider potential techniques to sustain behaviours following cessation of

the financial incentive and this approach may need to augmented with effective techniques for habit formation (John, et al., 2011).

A systematic review conducted by Paul-Ebhohimhen and Avenell (2007) investigated maintenance of behaviour change through the use of financial incentives in treatments for obesity/overweight. This systematic review included nine studies with a follow-up of one year or more. Results showed that incentives produced no improvement in weight loss maintenance at 12- or 18-months, after the incentives were removed and there was a trend toward weight regain above baseline at 30-month follow-up (Paul-Ebhohimhen & Avenell, 2007).

A further review looking at health promotion interventions which relied on financial incentives to change patient behaviour was conducted by Jochelson (2007). This review suggested firstly, that financial incentives are effective in encouraging individuals to perform clearly defined, time-limited, simple behavioural tasks; and secondly, that they encourage participation in programmes to bring about healthier lifestyles, but that this does not seem to lead to long-term maintenance of the healthier behaviour. Incentives were found to help individuals achieve their goals, but once the incentive was removed, individuals tended to relapse into previous behaviour patterns.

Another systematic review examining economic incentives for preventive care was conducted by Kane et al., (2004b). They concluded, positively though cautiously, that economic incentives [for individuals] are effective in the short term for simple preventive care and well defined, distinct behavioural interventions, i.e. immunisation programmes. Relatively modest incentives were found to be effective and the 'threshold dose' (that is, the level at which behaviour change takes place) appeared low. However, Kane et al., (2004b) concluded that there is insufficient evidence to say that incentives are effective at promoting complex and long term lifestyle changes, for example, smoking cessation or physical activity.

Cahill and Perear (2009) reviewed interventions using competitions and incentives for smoking cessation. Out of 17 studies, none demonstrated significantly higher quit rates for the incentive group compared to controls beyond the six-month assessment. There is some evidence, however, that although cessation rates have not been shown to differ significantly, recruitment rates can be improved by rewarding participation, which may be expected to deliver higher absolute numbers of successful quitters (Cahill & Perera, 2009). This therefore also supports the notion that financial incentives may be effective

in encouraging initiation of targeted behaviours, but not in the maintenance of such behaviours.

Giuffrida and Torgerson (1997) also conducted a systematic review to examine the effects of financial incentives on patient compliance with medication, medical advice or medical appointments. Incentives included cash, vouchers, lottery tickets or gifts. Ten out the eleven studies showed that some sort of financial incentive promoted compliance better than any alternative (including prompts, counselling, peer support, increased opening times, and behavioural therapy).

Despite inconsistent evidence, internationally, new programmes of health care are emerging that rely on financial incentives to encourage individuals to become more responsible for their own health. These programmes are based on economic and psychological assumptions about what drives human behaviour. Economic theory suggests that financial incentives can motivate individuals to change their behaviour by increasing the benefits associated with that behaviour. It is assumed that the incentive increases the financial benefit of adopting a healthier lifestyle, over the costs of making the change, or it removes a barrier to adopting the desired lifestyle. From a psychological point of view, when there is a lack in motivation to change a particular behaviour, a financial incentive offers the prospect of a reward for initiating a healthier lifestyle that on its own may not be sought after. However, as mentioned in Section 2.4.3, extrinsic rewards may have both enhancing and undermining effects on intrinsic motivation depending of the context in which they are presented. Evidence suggests that performance-contingent rewards increase extrinsic motivation while the contingency is present, but at the expense of decreasing intrinsic motivation once removed (Deci, et al., 1999). The explanation for this finding is that external rewards are often experienced as subtly controlling and therefore undermine autonomous motivation and this maintenance of behaviour once removed. In contrast, studies have also shown the effectiveness of extrinsic rewards in encouraging individuals to initiate healthy behaviours (Volpp, et al., 2009). Similarly, a number of studies have also demonstrated that offering small extrinsic rewards, in the form of financial incentives, increase enrolment and reduce disparities (Almeida, et al., 2010; Mutrie, et al., 2010).

Studies using incentive-based approaches to increase physical activity behaviour have drawn from research in other areas of behaviour modification such as drug misuse and have been used as part of multi-component strategies to encourage behaviour change

(Sindelar, 2008). A Cochrane review (Foster, Hillsdon, & Thorogood, 2005) has previously explored the effectiveness of interventions used to promote physical activity in adults and children and observed the use of financial incentives as a strategy to modify physical activity behaviour.

Sections 2.5.1 - 2.5.4 have presented evidence relating to the effectiveness of intervention components that are relevant to the current research in which the intervention combined use of health assessments, pedometers and financial incentives. The use of financial incentives was the central component of the WTB intervention component and therefore evidence relating to this is considered in more detail. The following section (2.6) presents a systematic review examining the effectiveness of positive economic incentives targeted at motivating individuals to adopt and / or maintain a physically active lifestyle for health improvement.

2.6 Incentivised Physical Activity Interventions: a Systematic Review

2.6.1 Introduction and Review of Methods

The aim of this review was to examine the effectiveness of positive economic incentives targeted at motivating individuals to adopt and / or maintain a physically active lifestyle for health improvement.

Positive economic incentives are measures that encourage people to undertake healthy activities, or discourage them from undertaking unhealthy ones, by offering immediate rewards to change their behaviour. This could include direct cash payments, vouchers, price subsidies, tax relief or some other non-financial incentive.

Inclusion Criteria

For inclusion in this review, studies were required to meet the follow four criteria:

(1) To be published in an English language, peer-reviewed journal.

(2) To include the use of an economic incentive for health promotion activities aimed at increasing levels, with physical activity or exercise as an intervention

component, for example, through encouraging adoption, adherence and maintenance.

(3) All participants were adults aged 16 years and above.

(4) Contained at least one physical activity or exercise related outcome measure.

Search Strategy

This literature search was carried out using seven electronic databases (PubMed, CINAHL, PsychInfo, EMBASE, SPORTDiscus, Web of Knowledge and the Cochrane Library) from the year of their inception up to and including August 2008. The search was then updated in March 2013 (with modifications in keeping with database changes to search terms / symbols).

The following search terms were identified and included in each of the database searches; 'Incentive' or 'Lottery' or 'Prize' or 'Reward' or 'Token Economy' AND 'Physical Activity' or 'Physical Fitness' or 'Exercise' or 'Sports' or 'Motor Activity'. For a comprehensive account of the search strategy and procedure employed and the article retrieval process see Appendix 1a.

Quality Scoring

Study quality was determined using the Effective Public Health Practice Project Quality Assessment Tool (Thomas, Ciliska, Dobbins, & Micucci, 2004), which has been used on a wide range of public health reviews (Armijo-Olivo, Stiles, Hagen, Biondo, & Cummings, 2012) (Appendix 1b and 1c). Article quality was assessed independently by two researchers (GH and DM). Scores were compared and any disparities were discussed until a consensus was reached.

2.6.2 Results

In total 1,934 references were retrieved from the database search. Twenty-eight studies were identified to have met the review criteria (Figure 3) (see Appendix 1b for a reference list of included studies). Table 2 and Table 3 present summaries of: study design; participants; type of incentive; outcomes measures; intervention design; and outcomes of the 28 studies included studies.

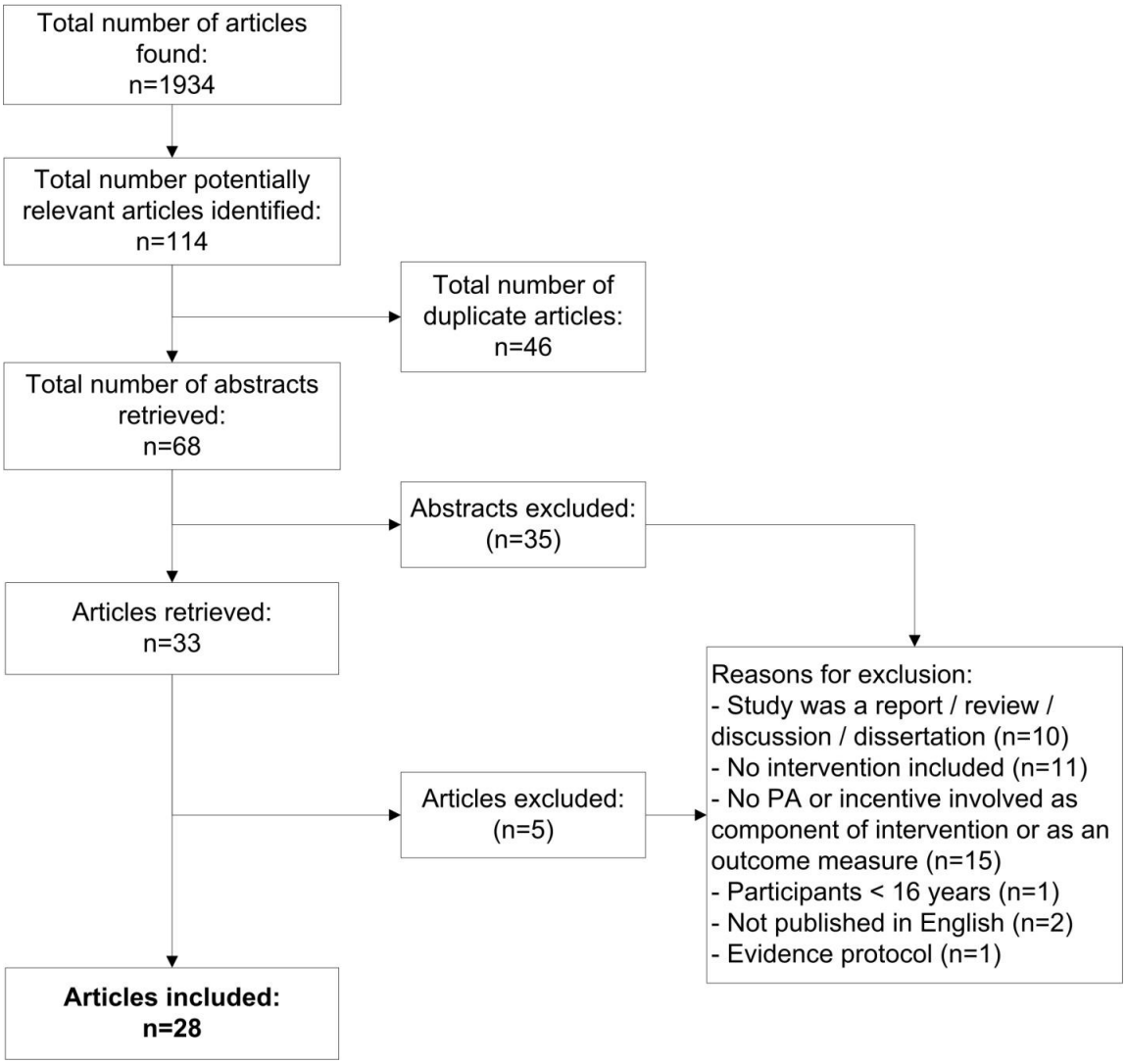

Figure 3. *Article retrieval process*

Table 2. *A summary table presenting study design, participants, type of incentives employed and outcomes measures of the 28 included studies*

Author and Setting	Design and Participants	Incentive	Outcome Measures	Follow-up
1. (Blake et al., 1996) USA: Worksite.	One group, post-test design. n = 119 (organisations) n = 17,626 (participants)	• Companies competed for awards that were based on average minutes of exercise per employee versus per participant. • Encouraged to use internal incentives.	1. Campaign activities, 2. Minutes of exercise, 3. Costs (recorded on implementation logs).	1 to 3 months.
2. (Epstein, Wing, Thompson, & Griffin, 1980) USA: University campus.	Matched pair design + control. n = 41 (Female)	• Behaviour contracting ($1 of participant deposit returned each week), • Lottery ($21 of combined group deposit). • Aerobics points (extra credit in psychology classes-one point/session required to be eligible)	1. Fitness, 2. Attendance at exercise sessions, 3. Aerobics points.	5 weeks.
3. (Finkelstein, Brown, Brown, & Buchner, 2008) USA: Community.	Randomised Controlled Trial (RCT) – two arm, single blind. n = 51 (completion of 4 week study) (n = 30 control, Age (mean) = 31.2years) (n = 21 treatment, Age (mean) = 59.54years) Target group: Sedentary, older adults	• **Control;** $75 for attending 'kick-off' meeting, wearing a pedometer daily and returning all study materials, • **Treatment;** $50 base participation + variable incentive depending on average daily aerobic minutes; $0 = < 15mins, $10 = 15 – 25mins, $15 = 25-40mins, $25 = > 40mins.	1. Aerobic minutes – at least 10mins of continuous walking, jogging or running. (60+ steps per min).	4 weeks.
4. (French, Jeffery, & Oliphant, 1994b) USA: University campus.	2 x 2 randomised design. n = 57 (F), Age = 37 ± 8 (mean ± SD) BMI = 27 ± 6 (mean ± SD) Target group: sedentary females.	• Facility access – free lockers ($20), free passes ($25) for the university sports centre facilities for 3months. • Self-reward – self selected activity to act as a reward for exercising. Reward delivered / withheld contingent of adherence to exercise contracts completed weekly.	1. Self reported physical activity (Paffenbarger (1986), 7-day recall = PA logs), 2. Use of recreational sports facilities, 3. Use of self-reward to increase exercise levels.	8 weeks and 6 months
5. (Fuller, Perri, Leermakers, & Guyer, 1998) USA.	Randomised design, (3 groups at baseline). n = 108, (M = 28, F = 80), Weight = 20 – 100% over ideal body	• **Group 1)** Control • **Group 2)** $1 for attendance + $1 for completion of eating and PA logs / wk. • **Group 3)** Monetary ($?) reinforcement when all level mastery criteria are met, then move to	1. Body weight, 2. Total Kcal intake and intake from fats, 3. Daily average minutes of exercise, 4. Knowledge of nutrition, physical activity and	Measures taken at baseline, 3 and 6 months.

	weight.	next level.	behavioural strategies for weight loss.	
6. (Garofalo, 1994) USA : Worksite.	One group, pre-post-test. n = 638	• Points awarded for aerobic activity, other types of PA, 'stress busting' activities + wise food choices. • Individual points contributed to team point totals. • Grand prize: 4 day Caribbean cruise for 2. • Individual prizes: 1,000 points = T-shirt, 2,000 points = American Heart Association cookbook, 3,000 points; $10 gift certificate for sporting goods.	1. Body weight, BMI, 2. Body composition, 3. Blood pressure, 4. Self-reported number of points earned per week.	12 weeks.
7. (Gomel, Oldenburg, Simpson, & Owen, 1993) Australia; Worksite.	RCT - Cluster randomisation procedure using worksite, not individuals. n = 431 (M = 359, F = 72) Age = 32 years (mean)	• Lottery + competition – two lottery draws for $40, $40 for meeting three month goal, 1 in 4 chance of $1000 prize for station with highest percent of individuals meeting goals.	1. BMI, 2. Serum Cholesterol, 3. Cigarette Smoking, 4. Blood Pressure, 5. Aerobic Capacity.	18 months (Baseline, 3, 6 and 12 months).
8. (Green, Cheadle, Pellegrini, & Harris, 2007) USA: Worksite (Health facilities).	One group, pre-post-test. 'Active for Life' (Centres for Disease Control) n = 1167 (n= 565 completed) F = 86% Age = 59% aged btw 35 and 54 years	• Incentives given to all participants for completion = athletic socks + bicycle lights. • Collection of weekly points; team and individual prizes awarded to highest point scorers. • Additional incentives given for completion of evaluation = prize drawers e.g. gift cards, + grand prize of a spa day.	1. Levels of physical activity; a) Stage of change (Prochaska & DiClemente, 1982), b) Godin Weekly Leisure-Time Exercise c) Exercise Metabolic Equivalents (METS scores/wk), d)Amount of exercise (work up a sweat)/ week, 2. Fruit and Vegetable consumption, 3. BMI, 4. Satisfaction with work.	10 week program, follow-up at 6 months.
9. (Hammond, Leonard, & Fridinger, 2000)	One-group, pre-post test. n = 3740 enrolled; n = 1192 (32%)	• Meal coupons, hotel accommodation, local entertainment.	1. Movement from stage to stage of the TTM,	50 days.

USA: Worksite.	completed.	• Incentives given to teams with high percentages of group participation and high goal achievement.	2. Employee participation, 3. Achievement of personal physical activity goals, 4. Attitudes, motivations and perceived benefits, 5. Barriers to Challenge participation.	
10. (Harland et al., 1999) UK: Community.	RCT n = 523 (M = 217, F = 306) Age = 40-64 years	• 30 vouchers –exchange for one episode of activity at local leisure facilities.	1. Self reported physical activity score (National Fitness Survey Questionnaire) in the previous 4 weeks.	12 weeks and 1 year.
11. (Herman et al., 2006) USA: Online.	Comparison of participants and non-participants using Health Risk Appraisal. n = 126,371 eligible employees, Active VFC participants; n = 67,324, Non-participants; n = 59,048	• $150 cash rebate for participation in Virtual Fitness Centre. Requirements; - elect to participate in VFC program, - log minutes of physical activity online, - engage in $\geq$ 20 minutes of physical activity, 3 days/wk for 10/12 consecutive wks.	1. Health Risk Appraisal (HRA) – University of Michigan –used as a health awareness tool, 2. Changes in PA (minutes), 3. Changes in body weight risk (BMI $\geq$ 27.5 kg/m^2, 4. Overall risk associated with VFC activities.	12 months.
12. (Jeffery & French, 1997) USA: Community.	RCT – Pound Prevention Study n = 1226, M = 228, Age (mean) = 35.2 years F= 594 (high-income) Age (mean) = 36.6 years	• Group 3) name entered into a $100 lottery draw each month	1. Smoking, 2. Body weight, 3. Diet (60 item Block Food Frequency Questionnaire), 4. Physical activity (Questionnaire – converted to metabolic equivalents, METs), 5. Weight control behaviours.	12 months.
13. (Jeffery & French, 1999) USA: Community.	RCT (~ 50% randomised to control condition and the remainder to one of two intervention conditions). n = 822 M = 228, F = 594 Age = 20-45 years	• Cash - $100 lottery, one per month for a 1 in 10 chance over 3 years.	1. Participant characteristics, 2. Body weight, 3. Diet, 4. Exercise, 5. Weight control behaviours, 6. Process measures, 7. Message recognition,	3 years-annual assessment

			8. Direct measure of incentive.	
14. (Jeffery & Wing, 1995) USA: Community.	RCT (Randomised by gender and centre to one of five experimental conditions). n = 202 M = 101, F = 101, Age = 37 years (mean) BMI = 31 (mean)	• Financial rewards up to $25 per wk for achieving and maintaining weight loss.	1. Body weight, 2. Total energy intake + % energy from fat, 2. Physical activity (Paffenbarger, 1986). 3. Perceived barriers to adherence, 4. Nutritional knowledge, 5. Attendance at sessions.	18 (post-intervention) to 30 months.
15. (Jeffery, Wing, Sherwood, & Tate, 2003) USA: University campus.	Randomised, pre and post intervention measures. n = 202, Age (mean) = 42.2 $\pm$ 6.4 years Age (range) = 58-50 years Obese = overweight by 12-32kg	• High physical activity (HPA) group; $3 for each week that participants achieved or exceeded the energy expenditure (EE) goal of 2500 kcal/wk during the last 6 months of active intervention. • Control: standard behaviour therapy (SBT).	1. Physical activity (Paffenbarger Physical Activity Questionnaire), 2. Dietary intake, (60-item version; Block diet questionnaire).	18 months (baseline, 6, 12 and 18 months).
16. (Jeffery, et al., 1998) USA: Community.	RCT (Randomised in each setting to one of five treatment groups). n = 196 (M = 29, F = 167) Age = 25-55 years Weight = Required to be 14-32kg overweight	• Cash-minimum of $12.50 to maximum of $25 per week depending on percent of goal attained. $266 potential total per person.	1. Weight Change, 2. Physical activity (Paffenbarger Physical Activity Questionnaire), 3. Psychological status, 4. Caloric intake.	18 months.
17. (Kravitz & Furst, 1991) USA: University campus.	Two independent groups study design. **Study 1:** n = 266 (M = 20 F = 246) Age (mean) = 22.5yrs **Study 2:** n = 264 (M = 20, F = 249) Age (mean) = 21.8yrs	• Rewards of exercise clothing given to individuals or teams based on attendance at an aerobic dance class.	1. Attendance (at an aerobic dance class).	Post-16 week semester

18. (Noland, 1989) USA: University campus.	Participants randomly assigned (within blocks) to one of three conditions. Self monitoring and reinforcement on exercise adherence. n = 77; (M = 28, F = 49) Age (mean) = 38.41 years (SD = 9.28)	• The reward group (2) received tokens from significant other if exercise bout was of sufficient duration (15 minutes) and achieved the target heart rate. 9 tokens = reward of participants choice	1. Exercise behaviour (standardised forms) – reported to investigator (groups 1 and 3) or to significant other (group 2), 2. Cardio-respiratory fitness, 3. Body density.	18 weeks.
19. (Pescatello, Murphy, Vollono, Lynch, & et al., 2001) USA: Hospital site.	4-year longitudinal cohort design (1995-1998): CHAP Intervention n = 621 (n = 278 completed) M = 36, F = 242, Age = 40.6 (mean) $\pm$ 0.5	• $100-$150 for participation, • Reimbursement of program registration fees for CHAP ^{Plus}.	1. Blood pressure, 2. Blood Cholesterol, 3. Blood glucose, 4. BMI. 5. Wais-hip ratio, 6. Program participation, inc. exercise, nutrition, weight management, smoking cessation, cardiac rehabilitation.	4 years.
20. (Poole, Kumpfer, & Pett, 2001) USA: Worksite.	Prospective cohort design n = 304, M = 142, F = 162 Age = 40.3 (mean) $\pm$ 8.76 years.	• Points tallied at annual assessments; financial rebates awarded depending on accumulated points each year. • Rebates range = $75 to $300 (mean = $102).	1. Risk Appraisal – addressing eating, exercise and other lifestyle behaviours, 2. Blood cholesterol, 3. Body fat, 4. Blood pressure, 5. Smoking status, 6. Physical activity levels.	4 years. Measures taken at baseline and annually for 4 years.
21. (Pope & Harvey-Berino, 2013) USA: University Campus (students).	RCT (no-treatment vs. intervention conditions) n = 117 (n = 39 control; M = 14, F = 25) (n = 78 intervention; M = 29, F = 49) Age = 18 years. Ethnicity – 85% white.	• Weekly monetary payments for meeting researcher-set fitness centre use goals. Incentives increased with increase in number of 'goal' fitness centre visits per week. Weekly payments ranged from $10 (week 1) to $38.75 (week 12) with a maximum total of $310.50 across the 12 week intervention.	1. Fitness centre use (number of visits), 2. Change in BMI (Height and weight).	2 weeks post 12 week intervention.

22. (Robison et al., 1992) USA: Worksite (University campus).	Pre- and post-test group intervention. n = 137 M = 82, F = 55, Age = 39.8 ± 1.3 years (experimental group), 35.4 ± 2.9 years (comparison group).	• Participants 'bet' on themselves by investing $40 at beginning of program. - Each time participant did not succeed in fulfilling contract % of deposit was forfeited to members of teams in which everyone had met their contracts. - Team with most money at 6 months received $150. - Individuals in each worksite accrued chances for a $150 cash lottery dependent upon number of completed weeks. • - $50 cash lottery at 4-5 weeks to encourage attendance.	1. Heart Rate, 2. Blood pressure, 3. Body fat %, 4. Body weight, 5. $VO_{2max,}$ 6. RER (Respiratory exchange ratio), 7. Treadmill test time, 8. Adherence to exercise program.	6 months.
23. (Scott & Goldwater, 1998) Canada: University campus.	One-group, pre-post test. n = 1 (team, made up of n = 20 rugby players) Age = 18.8 years (mean)	• The player with the best hand at the conclusion of the 'poker game' (each week) won $40; the second best hand won $10.	1. Team Attendance, 2. Team performance in competition.	6 months,
24. (Stein, Shakour, & Zuidema, 2000) USA: Hospital site.	One group, pre-post test design. Longitudinal. Employer sponsored health promotion. 1994, n = 2421 1995, n = 2661 1996, n = 2888 1997, n = 2757	• Employer's contribution to the cafeteria plan benefit package is adjusted based on results of an annual screening. The adjustment (health quotient [HQ]) can range from -$25 to +$25 per pay period.	1. Blood pressure, 2. Serum lipids, 3. Body fat, 4. Physical fitness, 5. Self-reported components; a) Tobacco usage, b) Alcohol usage, c) Motor vehicle safety, d) Physical activity, e) Diet.	4 years.
25. (Tucker, May, Bennett, Hymer, & McHaney, 2004) USA: Health facility.	One group, pre-post-test Gym-based structured exercise and diet program. n = 69 with Type II diabetes. M = 37, F = 32,	**Post-intervention;** • $3,000 each for 1st place male and female competitors, • $1,000 each for 2nd place male and female, • $500 each for 3rd place male and female,	1. Weight, 2. Body composition, 3. Quality of Life (SF-8), 4. A1C and LDL lipid levels,	5.5 months.

	Age (mean) = 56 years	• $750 for 'Most inspirational' award winner, • $ 750 for 'Best essay' award winner, • $250 for 'Best patient' award winner.	3. Points awarded for healthy behaviours, e.g. gym attendance, diet tracking, body composition improvement, education sessions and adherence to the diabetes care regimen.	
26. (Wiggam, French, & Henderson, 1986) USA: Retirement community.	Multiple baselines, time-series design. Case study approach. n = 6 (F) Age (range) = 70-92 years. Age (mean) = 77 years.	• Participants were awarded with self-selected reinforcers (including, edibles, household items and entertainment tickets) if they were able to increase the distance walked each day by at least 5% over the baseline distance for each of the 14 days of the intervention = 5 points per day.	1. Distance walked (yards),	2 weeks.
27. (Wing, Jeffery, Pronk, & Hellerstedt, 1996) USA: Community.	RCT - 24 week behavioural weight control program. n=37 Age = 25-55 years Weight = Required to be 9-36kg over ideal bodyweight.	• One $50 gift certificate (unknown type) at each exercise session and one $200 travel certificate at last group session.	1. Behaviour change: a) Weight Loss, b) Physical Activity, c) Calorie Intake, d) Barriers.	24 weeks.
28. (Yancey et al., 2006) USA: Health facility.	Randomised, attention-controlled, two group trial. n = 366, Obese, African American Females, Age (mean) = 45.54 years	• 1 year free gym membership, • $50 per follow-up assessment attended. • Intervention group; free pedometers and exercise bands.	1. BMI, 2. Bioelectrical Impedance Analysis, 3. Waist-Hip Ratio, 4. Aerobic fitness – 1 mile run / walk, 5. Physical activity, 6. Sedentary behaviour (hours of TV watched).	2-, 6- and 12-months

Table 3. *A summary table presenting intervention design and study outcomes of the 28 included studies*

Author	Intervention	Outcomes	Quality Score
1. (Blake, et al., 1996)	Intervention: Minnesota Heart Health Program (MHHP) Annual exercise campaign (lasting 1- 3months) • **Shape Up Challenge I:** Exercise campaign, plus six other intervention components in a small agriculturally based setting. Competition with employees recording the number of minutes spent daily in aerobic activities. • **Shape Up Challenge II**: Exercise campaign in same setting as challenge I (one year later). • **Shape Up Challenge III:** Supplementary to promotional activities taking place at a large industry based setting. - Employees of participating companies recorded the minutes spent daily in aerobic activities (e.g. brisk walking, running, bicycling, and racquetball).	• Of the 365 companies invited to participate, 33% participated (range 15% to 50%). • Challenge I: • Participating companies were more likely than non-participating companies to offer other health promotion programs and perceived greater benefits from participation. • Women and smaller companies had significantly greater participation rates than men and larger companies. • Average employee participation rates ranged from as high as 84% in smaller organizations to as low as 16% as organization size increased.	Weak
2. (Epstein, et al., 1980)	• **Group 1) and 2)** - Behaviour contracting (C_1, C_2); 2 miles/day over 3/5weeks, 1 mile/day for following 2 weeks. - Participant deposit of $5. $1 returned per week for attending 4/5 exercise sessions; • **Group 3)** Behaviour contracting C_3; 1 mile/exercise session. • **Group 4)** Lottery ($21); 1 mile/exercise session. • **Group 5)** No-treatment control. All groups: Daily running time and daily performance were converted to aerobics points.	• A significant treatment effect found for attendance ($F_{(4, 32)} = 3.38$, $p < .025$). Mean sessions attended for the 3 contract groups and the lottery group were equivalent and superior to the attendance in the control group. • Significant treatment effects were found for changes in 12-minute test (from pre- to post). Changes occurred for contract groups 1 and 2, which was superior to the change for the lottery and control groups. The mean change for contract 3 was not significantly different from any of the other four groups. • Significant treatment effects found for number of aerobic points. Post-hoc tests on mean points earned showed that the two groups that ran further distances (C1 and C2) earned more points than the control group. • C1 earned significantly more points than C3 and the lottery group. • Correlation was found between aerobic points earned and changes in physical fitness ($r = .55$ (df = 35), $p < .01$).	Moderate

3. (Finkelstein, et al., 2008)	• **Control and treatment arms:** attended a 'kick-off' meeting which involved a presentation and handout. Both groups undertook the same intervention; - Complete a socio-demographic survey at baseline, - To wear a pedometer daily for four weeks - and in particular, when or if they engaged in sustained walking, jogging or running, - To complete activity logs for weeks 1 and 2, each week, participants were asked to send back a one-page activity log, which included daily aerobic minutes and daily aerobic steps, - Activity logs for weeks 3 and 4 were posted during the intervention. • **Control arm:** $50 for participation • **Treatment arm:** $50 for participation plus incremental incentives based on average aerobic minutes per day.	• **Control arm:** averaged approx. 20 aerobic minutes per day over the 4-week study period and showed a slight decrease in average walking over the 4 weeks. • **Treatment arm:** averaged 35 aerobic minutes per day during the 4 weeks, or 79% more minutes. • After controlling for socio-demographics, the adjusted treatment effect is just over 16 more aerobic minutes per day ($p<0.001$) for those in the treatment arm. • College graduates logged 11 fewer minutes of aerobic activity ($p < 0.001$) than those who did not complete college • Household incomes > $50,000 logged over 8 fewer aerobic minutes ($p < 0.05$); higher income individuals may be less motivated by incentives. • Average incremental payout for those in the treatment arm was $17.50 per week for the 1.8 extra hours of aerobic activity they performed, or roughly $9.70 per additional hour of aerobic activity. Annualized, total $910 per year.	Strong
4. (French, et al., 1994b)	• **Group 1)** Facility access, no self-reward, • **Group 2)** Self reward, no facility access, • **Group 3)** Facility access + self reward, • **Group 4)** Control – no facility access + no self-reward. All groups attended one class per week for eight weeks involving exercise related presentation + walking / jogging round indoor track (optional).	• N = 51 (out of 57) completed the 8-week program and 6-month follow-up. • Treatment groups did not differ in weekly energy expenditure estimates from the Paffenbarger physical activity recall or physical activity logs. • Significant effect for time was found; all treatment groups increased their PA levels over time. Levels maintained at 6-month follow-up. • PA levels among groups given free access to facilities did not differ from groups not given free access. • Participants in group 1) and 3) reported using the facilities more frequently during the first 4 weeks of the program ($p < .01$) but not during the following 4 weeks or during follow-up compared to non facility access groups. • All groups reported significant increases in the use of the self-reward strategy over time ($F (2, 86) = 4.48$, $p < .01$). The self-reward groups did not use this strategy more frequently than groups not instructed to self-reward exercise adherence.	Moderate
5. (Fuller, et al., 1998)	• **Group 1)** Weight loss education (WLE) – health education program (monthly for 6 months). Including nutrition, behavioural strategies for changing eating, physical activity habits and guidelines for increasing	• Attrition; 20.4% (n = 22) – not statistically associated with treatment condition. • At post-treatment group 2); BT and group 3); BT and PSA demonstrated significant beneficial changes in Kcal consumption, intake from fats, physical	Strong

	physical activity. • **Group 2)** Standard behavioural treatment (BT) – 25 weekly treatment sessions, inc. self-monitoring, goal setting, stimulus control + cognitive restructuring. Average kcal intake per day (1,200(F), 1,500(M)). Physical activity goal, walking 60 min / day, 6 days / week plus contingency contracts. • **Group 3)** BT and personalised skill acquisition (PSA) – BT and reinforcement based on mastery of behavioural skills – nine levels of mastery, monetary reinforcement for mastery of each level.	activity levels and body weight (body weight reduction = significantly greater than in group 1) – WLE. • Although both BT and BT + PSA groups significantly increased their physical activity levels, between group difference was not significant. • Group 3); BT and PSA was no more effective than group 2); standard BT. • Significant diff. observed in the amount of monetary reinforcement received within group 2); BT and group 3); BT + PSA ($p < .05$). Participants in group 2) received a greater percentage (82.2%) of the total number of $ possible than individuals in group 3) (70.4%) • Summary, addition of a PSA may not produce better outcomes than standard BT and that WLE alone is not sufficient to produce weight loss and increase physical activity.	
6. (Garofalo, 1994)	• Incentive program for lifestyle change; - At sign up – program pack distributed (PA / food records, diary forms, and dietary info). - Educational materials e.g. The Hope Health Newsletter, lecture on aerobic exercise. - Low-fat recipes distributed weekly via email.	• Attrition rate = 18.5%. • 358 employees lost weight and 271 decreased their % of body fat. In total participants lost 1,764 lbs. • 83% earned 1,000 points, 59% earned 2,000 points, and 18.3% earned 3,000 points. • Self report surveys (completed by n = 377) showed; 67% exercised more frequently than prior to the program and 99.1% felt they would continue to exercise.	Weak
7. (Gomel, et al., 1993)	• **Group 1)** Control – Health risk assessment (HRA), n =115 completed. • **Group 2)** HRA + risk factor education, n=70 completed. • **Group 3)** HRA + behavioural counselling, n=102 completed. • **Group 4)** HRA + behavioural counselling + financial incentive, n=77 completed.	• Significant findings**:** BMI, body fat percent, mean blood pressure, aerobic capacity (for all groups), quit rates. • No significant differences in aerobic capacity between groups over 12 months • **Possible confounders:** unknown contribution from; - incentive, - positive or negative team peer pressure, - positive or negative effect of results reported publicly within the worksite.	**Strong**
8. (Green, et al., 2007)	• Weekly goals set for minutes of physical activity, 1 minute = 1 point. • Participants scored on goal attainment (% of goal). If weekly goal was	• Increases in PA at 10 weeks were large and statistically significant. • Number of sedentary individuals decreased from 23% to 6% ($p < .001$).	Weak

	meet, encouragement to set higher goal. • All participants received a pedometer.	• Participants meeting Centres for Disease Control (CDC) guidelines increased from 34% to 48% ($p < .001$). • Percentage exercising long enough to work up a sweat often and sometimes increased from 71% to 91% ($p < .001$). • METS increased from 35.2 to 44.7% ($p = .04$). **Follow-up:** • Majority of 6 month measures did not significantly differ from baseline except the % exercising enough to work up a sweat which increased from 74% at baseline to 83% at 6 months ($p = .005$). • % of participants eating 5 portions of fruit and vegetables per day increased to 73% at 10 wks from 46% at baseline and remained increased at 6 months ($p <.001$). • BMI remained unchanged.	
9. (Hammond, et al., 2000)	• CDC Directors Physical Activity Challenge. 50-day worksite health promotion intervention. - Management support and peer leadership. E.g. peer led walking groups. - Goal setting contract; a point system to measure participation and progress. 10 minutes PA = 1 point. Set own points goals. - Multilevel incentive; foster competition, goal achievement and social support.	• 86% of those in contemplation and 64% of those in preparation, and 34% of those in action advanced to a higher stage.	Weak
10. (Harland, et al., 1999)	• **Group 1)** Control-baseline health risk assessment (HRA), n=91 completed. • **Group 2)** Baseline HRA + 1 interview, n=96 completed. • **Group 3)** Baseline HRA + 1 interview and voucher, n=88 completed. • **Group 4)** Baseline HRA = 6 interviews, n=88 completed. • **Group 5)** Baseline HRA = 6 interviews and vouchers, n=79 completed.	• Attendance higher in intervention groups offering vouchers (86% vs. 77%). • PA scores differed across 4 intervention groups combined vs. controls ($p = .001$). • No sig. diff attributable to vouchers within 4 intervention groups ($p = .84$). • Regression analysis showed interaction effect between vouchers and interview ($p = .01$). Highest proportion of participants with increased PA scores (55%) in intervention group 5 (39% higher than control group). • Increased self-report of moderate and vigorous PA in intervention groups combined compared to controls. No sig effect within intervention groups due to interviews, vouchers, or the interaction between them.	Moderate

		• No lasting effects at 12 month follow-up.	
11. (Herman, et al., 2006)	• Virtual Fitness Centre key features; - PA goal setting and activity logging. - Team based 12 wk seasonal programs throughout year. - Progress reports, - Ask our pros, (online questions for experts to respond to). • Population subgroups; Group 1) VFC participants Group 2) Rebate recipients Group 3) Non-rebate recipients Group 4) Non-participants	• A total of 53.8% of total eligible employees were VFC participants and reduced their risk for physical inactivity (8.4% points), life dissatisfaction (2.1), low perception of health (1.9), high risk status (1.3), smoking (0.4), and high body weight (0.2).	Weak
12. (Jeffery & French, 1997)	• **Group 1)** No contact control, • **Group 2)** Education (through monthly newsletters) plus nutrition and exercise sessions, • **Group 3)** Education plus lottery incentive.	• Mean body mass indices at baseline were 28.1, 26.1, and 28.2 for men, high-income women and low-income women, respectively. • After one year, participants in the intervention conditions reported significantly increased frequency of weight monitoring, but no change in other targeted behaviours. • One year weight changes in the control, education, and education plus lottery groups were 1.94 lb, 0.72 lb, and 0.21 lb in men; 1.38 lb, 1.03 lb, and 0.51 lb in high-income women; and 1.30 lb, 2.11 lb, and 3.23 lb in low-income women.	Moderate
13. (Jeffery & French, 1999)	• **Group 1)** Control-no contact, n=414. • **Group 2)** Low-intensity education (newsletter), n=197. • **Group 3)** Low-intensity education (newsletter) + financial incentive (Lottery), n=198.	• Significant differences were found between the response rates of returned postcard (direct measure of incentive); Group 2 – 65%, Group 3 – 71%, ($p < .05$). • No significant differences were found for weight gain, or behaviour change, although change was in the right direction.	Moderate
14. (Jeffery & Wing, 1995)	• **Group 1)** Control group, • **Group 2)** Standard behaviour therapy (SBT); counselling sessions; 1/wk	• Eighty eight percent (n=177) completed the 30-month follow-up evaluation. • No overall difference between treatment groups in overall weight loss at 30	Strong

	for 20wks, 1/month thereafter + weekly weigh-ins, • **Group 3)** SBT + food provision each wk for 18mths, • **Group 4)** SBT + incentives, • **Group 5)** SBT + food provision + incentives.	months, F (4, 157) = 0.87, p < .45).	
15. (Jeffery, et al., 2003)	• **Group 1)** standard behaviour therapy (SBT) for obesity, incorporating an energy expenditure (EE) goal of 1000 kcal/wk. Treatment conducted in groups of < 20. • **Group 2)** high physical activity (HPA) treatment, in which the goal was an EE of 2500 kcal/wk. Plus use of exercise coaches • Sessions for both groups; weekly for 6 months, biweekly from 6-12 months, monthly from 12-18 months.	• The HPA treatment group reported achieving higher mean (+/- SD) physical activity levels than did the SBT group at 6-, 12-, and 18-months (all p < .01). • Mean (+/- SEM) cumulative weight losses at 6, 12, and 18 mo in the HPA treatment group were 9.0 +/- 7.1, 8.5 +/- 7.9, and 6.7 +/- 8.1 kg, respectively. In the SBT group, the corresponding weight losses were 8.1 +/- 7.4, 6.1 +/- 8.8, and 4.1 +/- 7.3 kg, respectively. • Between-group differences in weight loss were significant at 12 and 18 months.	Moderate
16. (Jeffery, et al., 1998)	• **Group 1)** Control - Standard Behaviour Therapy (SBT), n=40. • **Group 2)** SBT + Supervised Exercise (SE), n=41. • **Group 3)** SBT +SE + personal trainer, n=42, • **Group 4)** SBT + SE + financial incentive for attendance at exercise session, n=37. • **Group 5)** SBT + SE + personal trainer + financial incentive, n= 36.	• Intervention groups differed significantly across in supervised walk attendance (p < .001). • Main effects observed for group 3 (personal trainer) (p < .001) and for group 4 (financial incentive) (*p values* ranged from .02 to .001). No significant effects found for interaction. • Used singly, the trainer and incentive interventions each approx doubled walk attendance over 18months. Together, attendance increased x 3. • No sig. differences for self reported exercise behaviour and body weight.	Moderate
17. (Kravitz & Furst, 1991)	• **Study 1:** Group 1) Rewards (n = 109) individual rewards for attendance, Group 2) Social support + reward (n = 54) group rewards for attendance (3 per group, n = 18), Group 3) Control (n = 103) no reward or social support. • **Study 2: (Follow-up study)** Group 1) Rewards (n = 68) individual rewards for attendance,	**Study 1:** • Significant differences were found in the overall attendance of the groups ($F_{2,257}$ = 15.2, p < .01). • Groups 1 and 2 (reward groups) had significantly better attendance than group 3. • The attendance of students competing individually (Group 1) for rewards did not differ significantly from those competing in three-person teams for rewards (Group2).	Weak

	Group 2) Social support + reward(n = 42) group rewards for attendance (2 per group, n = 21), Group 3) Control (n = 154) no reward or social support. • Participants self selected their own groups.	**Study 2:** • A significant difference was found for overall attendance ($F_{2,241} = 14.0$, $p < .01$). • Again, groups 1 and 2 had significantly better attendance than those in group 3. • No significant difference in the attendance of individuals in group 1 and two-person teams in group 2.	
18. (Noland, 1989)	• **NEWS (**Campus Newsletter) group vs. **AF** (Adult Fitness) group. - Group 1) Self monitoring, recorded own exercise behaviour. - Group 2) Reinforcement supplied by significant other (reward), verbally reported their exercise behaviour - Group 3) Control. • All subjects: Exercise individually for 18 weeks: - Aerobic exercise for ≥ 3 x / wk for ≥ 15 minutes / session for first 4 wks. - Remaining 4 wks aerobic exercise for ≥ 30 minutes, 3 x / wk. - Participants were set heart rate goals for exercise depending on goal. - Exercise with ≥ one other person.	**NEWS group:** • Pre-and post-treatment tests revealed no significant treatment or interaction effects. • Group 2 had an improvement of 11% in predicted VO_2 Max and a 9bpm improvement in exercise heart rate compared to 7.8%, 5bpm in group 1 (self monitoring) and 5.3%, 6bmp for group 3 (control). Groups 1 and 2 improved significantly on these variables, the control group did not. • Groups 1 and 2 reported significantly higher frequency of exercise per week than group 3. **AF group:** • Maintained their fitness level (with the exception of a small increase in body fat) over the 18 week period. • The behavioural interventions had little differential effect on adherence by AF participants who were already regular exercisers.	Weak
19. (Pescatello, et al., 2001) .	$CHAP^{Plus}$ v. $CHAP^{Only}$ • CHAP = Annual cardiovascular screen + individualised results counselling. Participants self-selected one of two groups: 1. **$CHAP^{Plus}$** (n=198), structured health education and behavioural support, 2. **$CHAP^{Only}$** (n=80).	• Associated health benefits of CHAP participants were greater in the $CHAP^{Only}$ group compared to the $CHAP^{Plus}$ group, (n.b. not reaching levels of significance). • $CHAP^{Plus}$ members reported higher participation rates in exercise programs (69.4%), flowed by nutrition and weight management (22.9%), with minimal enrolment in smoking cessation and cardiac rehabilitation (0.5%).	Moderate
20. (Poole, et al., 2001)	• Participants kept monthly logs on positive lifestyle behaviours, inc. PA, smoking status, seat belt use, self exams, and educational activities etc – Each activity are converted into points.	• Modifiable health risk factors were significantly reduced over time among both higher and lower risk participant ($p < .05$).	Weak

		• There was a significant reduction in mean risk scores over time among all participants (p = .009). • Obesity prevalence decreased significantly over time among both men and women (p < .05). • The prevalence of high blood pressure, for both systolic and diastolic readings, decreased significantly over time (p < .05). • Physical activity improved over time. The percentage of participants engaging in regular physical activity < 3 x per week decreased significantly from year 1 (40.5%) to year 4 (31.6%) in the high risk group (p < .05). • Issues: self report measures not verified. Possible sampling bias because of low participation rate and attrition over time.	
21. (Pope & Harvey-Berino, 2013)	• **Group 1)** Intervention group: weekly goal setting for number of fitness centre attendances for 12 weeks. Weekly goals escalated from 2 x 30 minute to 5 x 30 minutes gym attendances over the 12 weeks. Weekly incentives escalated from $5 to $7.75 per attendance. Maximum total for one student $310.50 over the 12 week intervention period. - Access to study website that delineated the exercise goal for each week, providing general fitness tips. The incentive group website also displayed the potential 'earnings' for the week and a graphical display of actual earnings against potential earnings. • **Group 2)** Control group: weekly goal setting for number of fitness centre attendances for 12 weeks (same as intervention group). No monetary incentives. - Access to study website that delineated the exercise goal for each week, providing general fitness tips only. - Intervention and control groups receive assessments (height, weight, BMI, socio-demographics) at baseline and follow-up.	• Participants in control condition met the goal for fitness centre attendance 13% of the time over 12 week compared to 63% (p < 0.001). • A significant effect of week on fitness centre attendance (p < 0.01) for both conditions. More students met fitness centre attendance goals at week 1 compared to week 12. • No sig. interaction between condition and week (p = 0.23). Temporal changes in fitness centre attendance were not different for each condition. • No baseline differences in BMI between conditions. • Sig. main effect of time (p < 0.05). Overall BMI (both conditions) increased from an average of 23.7 (0.4) at baseline to 24.1 (0.4) at 14 weeks. • Interaction between time and condition was not significant (BMI increased similarly in both intervention and control groups). Weight gain was 1.2kg and 1.1kg for control and intervention groups, respectively. • Conclusion: Weekly monetary incentives resulted in significantly more participants meeting weekly fitness-centre attendance goals compared to control group. This increased fitness centre use by the incentive condition did not prevent increase in BMI at follow-up.	Moderate
22. (Robison, et	• **Group 1)** Experimental group = 5 x buildings (n = 117) = worksite	• Overall adherence rate for experimental group was 97% and for the comparison group, 19% (p < .01).	Weak

al., 1992)	exercise program + behavioural management package: - 15 x 1 hr educational / behavioural sessions over 6 months. - Behaviour contracts; specific aerobic exercise program for 6 month period. Frequency (4xper wk) and duration (30 min) set for individuals. Intensity determined by target heart rate ranges. Significant others verified attendance. - Worksite groups split into teams of 4-6 to aid implementation of incentive system. • **Group 2)** Comparison group = 1 x building (n = 20) = worksite exercise program (with no behavioural package). Completion of exercise diary = goal of 4 x 30 minutes of aerobic exercise per week. No incentive.	• **Resting measures:** - Experimental group; heart rate significantly reduced by 5 beats per min (p <.01). Body weight and % body fat decreased significantly over the 6 month period (p < .01). • **Responses to sub-maximal exercise:** - Heart rates significantly reduced (by 10 beats / min) for experimental group participants (p < .01). - Rating of perceived exertion significantly reduced in exp. group (p < .01). Recovery heart rates significantly lower at both 2 and 4 minutes post exercise. - Comparison group; heart rates inconsistently lower in the graded exercise test (p < .01). Ratings of perceived exertion also decreased after 6 months (p < .05). Recovery heart rates were not significantly different in the comparison group. • **Responses to maximal exercise:** - $VO_{2max,}$ in the exp. group increased by 2.6%. (p < .05). Exercise tolerance significantly increased (by 2 minutes) in exercise test time (p < .01). - VO_{2max} in the comparison group did not reach statistical significance. No significant difference in the exercise test time of comparison group participants.	
23. (Scott & Goldwater, 1998)	• Baseline 1 (9 wks): No experimental contingences, attendance recorded at 5 sessions per week. • Intervention 1 (7 wks): Lottery incentive system using a weekly poker game strategy Participants drew from the pack the number of cards corresponding to the number of training sessions they had attended that week. If participants had attended 4 or 5 session they were allowed to exchange 2 and 1 cards respectively. The participant with the best and second best hand were the winners of that week. • Baseline 2 (3 wks): Lottery withdrawn, • Intervention 2 (3 wks); lottery reintroduced, • Baseline 3 (1 wk): lottery withdrawn, • Intervention 3 (1 wk): lottery reintroduced.	• Team attendance at practice showed a clear effect of the lottery incentive. Average attendance at baseline 1 = 39* compared to intervention 2 where attendance = 58* N.B Team treated as single subject – if all players attended all weekly sessions attendance = 100. • Irregular duration of intervention phases indicated that the intervention was immediately effective. • Team won 100% of their games when lottery was in effect compared to winning 80% of games when the lottery intervention was withdrawn	Weak
24. (Stein, et al.,	• Annual health screening to calculate health quotient (HQ); based on; serum cholesterol, blood pressure, tobacco use, body fat, physical	• In the first year, participation was proportional to overall health risk (p < 0.01).	Weak

2000)	fitness, motor vehicle safety, nutrition, and alcohol consumption, • Health promotion activities, sponsored by the hospital • Each component of the health evaluation yields a score, derived from a model that weights the component according to their contribution to disease burden. • HQ is produced, • Human resources adjust the employees benefit package.	• Participation in targeted programs was proportional to levels of body fat, cholesterol, and blood pressure. • Participation in activity-related health promotion was proportional to prior-year activity or fitness scores. Health promotion participants improved their subsequent-year health risk more than did non-participants. • Participation was associated with reduced illness-related absenteeism and (although inconsistently) with medical claims paid and short-term disability.	
25. (Tucker, et al., 2004)	• Gym-based structured exercise and diet program. • **Gym Procedures;** Individual exercise program devised by certified trainers according to participant goals, including; - Cardiovascular exercise, weight training, stretching, balance work, - Points awarded for participating in a supervised group exercise class 1 x per week (1 hr functional exercise and movement). - Encouraged to engage in activity on remaining days of the week. • **Clinical Procedures;** - Physician visits to undertake outcome measurements. - Point scores contingent on completion.	• n = 30 (45%) completed the program. • Finishers averaged 4.5 days / week of some form of activity, e.g. walking, biking, hiking, swimming etc. • Cumulative gym visits declined during the course of the trial; decrease may reflect attrition of participants. • Significant improvements were found for A1C results; weight loss; decrease in body fat; inches lost from the abdomen, thigh and hips and the physical component score of the SF-8 ($p < .05$). • Weight loss was seen in 28 of the 30 participants who completed the program.	Moderate
26. (Wiggam, et al., 1986)	• Four walking pathways were developed in the retirement centre ranging from 70 yards to 880 yards. • Baseline walking distance established for each participant, defined as a consistent performance over 14 days with deviations between scores held to a maximum of 10%. • Subjects walked between the hours of 7am and 9 pm and recorded the route and frequency walked.	• The distance walked by each participant increased during the intervention phase. • Participants 1, 2, 3 and 5 each increased their walking distance by 100%. • Participant 4 increased their walking distance by 50% and participant increased their walking by 76%.	Weak
27. (Wing, et al., 1996)	• **Group 1)** Control group – Standard behavioural weight loss program. • **Group 2)** Standard behavioural weight loss program + financial incentives for attendance.	• The incentive group had a higher rate of attendance compared to controls (60.7% v 52.2% respectively) but this difference did not reach levels of significance. • No significant differences found for weight loss, overall physical activity, dietary intake and barriers.	Moderate

28. (Yancey, et al., 2006)	• **Intervention group** (n = 197): 8 weekly 2-hr interactive group sessions. Skills training in a balanced regular exercise regimen and a nutrition education program. Social support; encouraged to exercise with a significant other (who would also receive a free gym membership). • **Control group** (n = 197): 8 weekly, 2-hr interactive group sessions on current African American women's health topics without the external support.	• Attrition; intervention group = 4.6% (n = 9), control group = 7.3% (n = 14). Sample retention at 1 year = 71%. • A trend towards weight stability in the intervention group at 2 months compared with controls ($p = 0.08$), was found, disappearing at 12 months ($p = 0.001$). • Intervention and control participants' fitness (1-mile run-walk) improved by 1.9 minutes ($p < 0.001$) and 2.3 minutes ($p < 0.001$), respectively, at 12 months. • PA levels increased significantly from baseline only among the intervention group ($p < .0001$ and $p = .10$ at 2 and 6 months respectively). • Significant main effect of PA in the intervention group at 2 months ($p = .015$), remaining marginally significant at 12 months ($p = .058$). • A significant main effect of the intervention on fitness ($p = 0.019$) and a marginally significant effect on body mass index (BMI) ($p = 0.057$), at 2 months was found, disappearing by 6 months. • By 12-months, the control group showed a significant advantage in waist circumference stability compared with intervention participants (+1.1 cm, $p = 0.28$; +2.1 cm, $p < 0.001$, respectively).	Strong

2.6.3 Discussion of Review Findings

Study Design

Twenty-five of the 28 studies eligible for inclusion were carried out in the United States and one in the United Kingdom, Australia and Canada. Of the 28 studies reviewed, 10 were randomised controlled trials (RCT), four randomised trials, two were quasi-experimental trials with a reference or comparison condition and the remaining 12 were non-experimental cohort studies with no control or comparison condition. Eleven of the 28 included studies were conducted in a workplace setting; ten in a community setting and seven in a University setting.

Over half of the studies relied on self-reported instruments as the main measure of physical activity. For example, French, Jeffery and Oliphant (1994); Jeffery and Wing (1995) and Jeffery, Wing, Sherwood and Tate (2003) used the Paffenbarger 7-day Physical Activity Recall Questionnaire (1986). The remaining eleven studies employed an objective measure of physical activity which included measures of aerobic capacity such as VO_2 Max as used by Noland (1989) and Robinson et al. (1992).

The most common strategies implemented in interventions in addition to the use of financial incentives included: education programmes (Blake, et al., 1996; Fuller, et al., 1998; Jeffery & French, 1997; Jeffery & French, 1999); monitoring of behaviour (e.g., pedometer use, diaries, attendance) (Green, et al., 2007); and goal setting (Pope & Harvey-Berino, 2013). Some offered behavioural counselling (Gomel, et al., 1993; Jeffery, et al., 2003; Pescatello, et al., 2001), behaviour contracting (Epstein, et al., 1980; Robison, et al., 1992) and social support (Blake, et al., 1996; Kravitz & Furst, 1991; Yancey, et al., 2006) while others offered health checks (Gomel, et al., 1993; Harland, et al., 1999; Stein, Karel, & Zuidema, 1999).

Interventions also differed in the type of physical activity promoted, some promoted walking or running (Epstein, et al., 1980; Finkelstein, et al., 2008; Hammond, et al., 2000), the use of a fitness-centre or gym (Pope & Harvey-Berino, 2013; Yancey, et al., 2006) or the use of a personal trainer (Jeffery, et al., 1998; Tucker & Gilliland, 2007).

A wide range of positive economic incentives were employed in the identified studies, including direct cash payments, for example, Yancey et al. (2006) offered $50 for each follow-up attendance. Vouchers were also used in a number of studies, including Hammond, Leonard and Fridinger, (2000) who offered coupons for meals, hotel

accommodation, and local entertainment. As an alternative Harland, Drinkwater, Chinn, Far and Howell (1999) offered vouchers for free facility access in the local area. Price subsidies were employed by Stein, Shakour and Zuidema (2000), such that an employer's contribution to the cafeteria plan benefit package was adjusted based on results of annual employee screening. Epstein, Wing, Thompson and Griffin (1980) employed behaviour contracting ($1 of the participants deposit was returned each week upon completion of goals). The incentive of a lottery or prize draw was also employed by a number of studies, for example, Gomel, Oldenburg, Simpson and Owen (1993) offered a $40 lottery draw for participants who met a three month goal. This same study also employed competition between groups as an incentive to win a prize; a one in four chance of winning $1,000 for the work stations with the highest percent of individuals meeting goals. In addition, Herman et al. (2006) employed a $150 cash rebate system for participation in a virtual fitness centre. Table 2 and Table 3 includes information relating to the articles' theoretical background and design, the participants recruited and the setting of the intervention, intervention details, outcome measures, outcomes and study quality.

Study quality

A quality score was undertaken on all papers. The Effective Public Health Practice Project Quality Assessment Tool (Thomas, et al., 2004) was used to asses various elements of each article including, selection bias, study design, confounders, blinding, data collection methods, and dropouts. Following a quality score being applied to each study, and independently reviewed by two researchers, five studies received a strong rating, 11 a moderate rating and 12 a weak rating (Table 2). Most studies scored poorly on recruitment (selection bias) and blinding aspects of the quality score. The most common designs were non-experimental cohort studies with no control or comparison condition.

Evidence of Effectiveness

As Table 2 and Table 3 summarise, evidence from this review suggests that subsidising or directly paying individuals to undertake health care of various kinds can be effective – and, moreover, more effective than alternatives. However, maintenance of this is equivocal. For example, Harland et al., (1999) compared the effectiveness of three alternative combinations of methods to promote physical activity in Newcastle-upon-Tyne, UK. Five hundred and twenty three adults (aged 40 to 64 years) were randomised

to either a control group or one of four intervention groups that consisted of either brief (one interview) or intensive (six interviews over 12 weeks) motivational interviewing, with or without financial incentives (30 vouchers entitling free access to leisure facilities). The most effective intervention involved six motivational interviews and a financial incentive; 55% of these participants had increased physical activity scores, compared to 35% in the group that only received intense motivational interviewing. However, activity level was not maintained after one year.

Finkelstein et al., (2008) conducted an RCT involving 51 older individuals in which significant differences in average daily "aerobic minutes" were identified between a group receiving fixed weekly payments of $75 and a comparison group receiving $50 plus $10 or ($25) contingent on achieving an average of at least 15 (or 40) aerobic minutes per week. "Aerobic minutes" were measured using pedometers and defined as continuous walking, jogging or running at a rate above 60 steps per minute in at least 10 minute bouts.

Herman et al., (2006) conducted an observational study on the effects of a $150 cash incentive (via a rebate) to participate in an online physical activity programme (VFC – virtual fitness centre). To qualify for the rebate, participants were required to engage in at least 20 minutes of physical activity three days per week, for 10 out of 12 consecutive weeks. In the year prior to the introduction of the rebate in 2004, 13% (16,777 out of a total of 129,628) of eligible employees participated in the VFC. This increased to 53% when the cash incentive was introduced. Seventy-four per cent of the VFC participants completed sufficient exercise to receive the rebate (49,568 or 39%of total employees). Baseline prevalence values for health risks were significantly lower for VFC participants (measures of weight, stress, physical activity, life satisfaction, blood pressure, perceived health, disease, illness days, smoking status) with the exception being cholesterol levels. Risk status among those who received the rebate changed significantly over a 12-month period for all measures except weight and illness days. Significant differences in risk status between participants who received the rebate and those who did not accrue sufficient activity to qualify were found in activity levels, weight and illness days.

The Pound of Prevention Study reported by Jeffery and French (1997) resulted in more frequent monitoring in the intervention groups (education plus nutrition and exercise sessions; education plus lottery incentive) at 12-months but not differences in diet and

physical activity. Weight change did not differ between the intervention and control groups. Examination of the activities delivered revealed that participation was low for exercise options compared to the education (via correspondence) course on weight control.

Jeffrey and colleagues (1998) found that the presence of an incentive and personal trainer (separately) doubled attendance at supervised walking sessions compared to other conditions. A combination of incentive and personal trainer produced the best adherence (threefold increase in attendance). In relation to average level of total exercise, all five treatment groups achieved the study goal of 1,000 kcal/week at both six and 18 months. However, despite highly significant group differences in attendance at supervised exercise sessions, no differences were observed between the treatment groups in overall exercise level at either time point. Therefore, the financial incentive group influenced attendance but had no impact on physical activity level at six- and 18-months, as measured by the Paffenbarger Questionnaire and mean change from baseline in total exercise after adjustment for baseline values, center, and gender.

Strengths and Weaknesses of the Available Evidence

Most studies were aimed at changes in physical activity and diet and in particular for the purposes of weight loss. When studies did focus on physical activity, they focused on exercise and any distinction between the two concepts was not always made clear. As mentioned in Section 1.3, lifestyle physical activity is defined as the daily accumulation of 30 minutes of self-selected activities, which includes all leisure, occupational or household activities that are at least moderate to vigorous in their intensity, and could be planned or unplanned activities, that are part of daily life (Dunn, et al., 1998). In comparison, exercise is a subset of physical activity that is 'volitional, planned, structured, repetitive and aimed at improvement of maintenance of an aspect of fitness and health' (Biddle & Mutrie, 2007). Related to this, most studies were conducted in worksite and University campus settings (n =18) and focused on structured exercise promotion rather than 'free living' activity.

WTB was focused on the promotion of lifestyle physical activity, through walking and therefore the conclusions that can be drawn are limited. This, therefore, provides a rationale for the need to examine the effectiveness of financial incentives for promotion lifestyle physical activity, such as walking, as in WTB.

Financial incentives were commonly combined with other intervention components, such as, education programmes, health checks and social support. However, due to study design, it was not possible to isolate the effects of the financial incentives from other intervention components. The most common designs were non-experimental cohort studies with no control or comparison condition. In addition, sample sizes were not justified and some studies used very small sample sizes (implying low statistical power) e.g., Epstein, Wing, Thompson and Griffin (1980) and Scott and Goldwater, 1998). None of the studies included a qualitative component to gain further insights into the effects found. This, therefore, provides further rationale for the need to explore in-depth the potentially influence of financial incentives on behaviour change.

2.7 Summary

Although a variety of research supports the effectiveness of financial incentives, particularly through encouraging attendance and engagement, some evidence suggests that the benefits may be short-lived. There is insufficient evidence to say that financial incentives are effective for long-term lifestyle changes required for health promotion. Similarly, many questions persist about their potential usage in promoting lifestyle physical activity. Additional research is therefore needed to understand when and for whom incentives are likely to be most effective in encouraging the adoption of healthier behaviours, such as physical activity and whether long-term incentive schemes can enable people to maintain changes in behaviour. A mixed methods approach combining both qualitative and quantitative methodologies offers a way in which the use of financial incentives for behaviour change can be explored further. A mixed methods approach was applied to the evaluation of the WTB intervention.

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Chapter 3

This chapter has presented information relating to: theoretical models of behaviour change and motivation; correlates and determinants of physical activity; relevant physical activity interventions; and intervention components. In keeping with the focus of the present research, the following chapter is concerned with contextualising and providing a background to the research and will build on information presented in Chapter 1.

Chapter 3: Contextualisation and Background to Research

3.1 Introduction

This chapter provides a brief introduction to the area of Sandwell which is located in the West Midlands of the UK. It will provide details relating to the demographic and health profile of the area and set the context for the development, implementation and delivery of the Walk to Beijing (WTB) intervention.

3.2 Profile of Sandwell, West Midlands

3.2.1 About Sandwell

Sandwell is a metropolitan borough formed in 1974 and is one of seven authorities that make up the West Midlands. The Sandwell borough comprises six towns; Oldbury, Rowley Regis, Smethwick, Tipton, Wednesbury and West Bromwich which are further divided into 24 wards. Sandwell is part of the Black Country, which also includes the three metropolitan boroughs of Dudley, Walsall and the Southern parts of the city of Wolverhampton. Figure 4 shows the location of Sandwell in relation to its surrounding areas and the division of the metropolitan borough into its constituent wards.

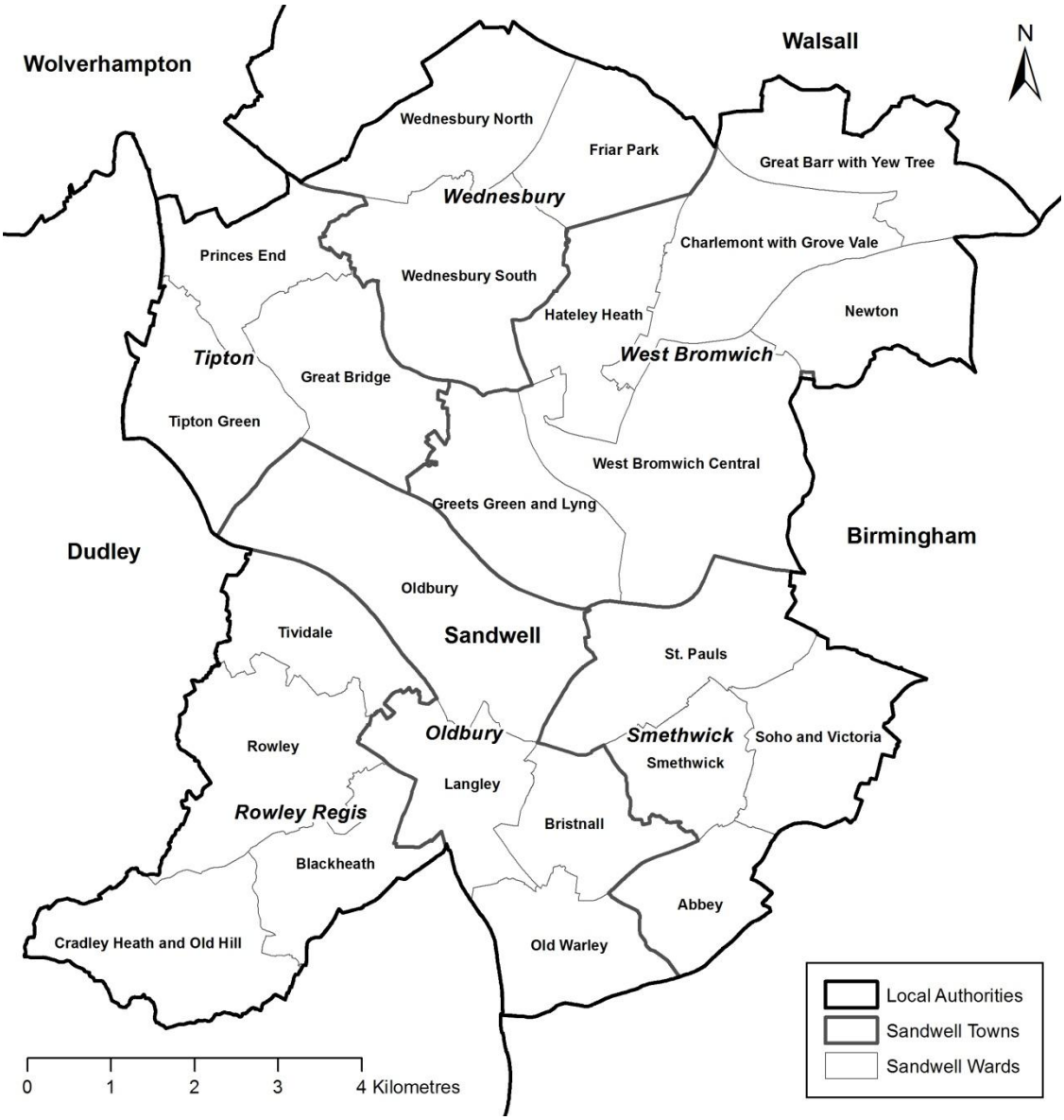

Figure 4. *A map to show the location of Sandwell in relation to its surrounding areas and the division of the local authority area by census ward*

3.2.2 Population Demographics

Sandwell has a population of 308,063 (Office for National Statistics, 2011b). The population of the area fell considerably from the late 1960's until the early 2000's, with some small subsequent population growth. Sandwell's total population is the second largest of the Black Country authorities, and has seen the largest percentage increase in population since 2001 (+8.9% compared with +6.2% in Walsall, +5.4% in Wolverhampton and +2.5% in Dudley). This population increase is also higher than the

7.8% increase in the population of England and Wales (Office for National Statistics, 2011b). The interim 2011 population projections predict an increase of 26,300 between 2011 and 2021, reaching 335,400 by 2021 (Office for National Statistics, 2011b)

Table 4. *Age and gender distribution of the Sandwell population*

Age (years)	Persons (n)	Male	Female
0-4	22,669	11,529	11,140
5-9	20,194	10,348	9,846
10-14	19,333	10,101	9,232
15-19	20,220	10,364	9,856
20-24	20,793	10,328	10,465
25-29	23,085	11,076	12,009
30-34	21,235	10,527	10,708
35-39	21,168	10,795	10,373
40-44	22,411	11,030	11,381
45-49	21,398	10,450	10,984
50-54	17,991	9,188	8,803
55-59	15,495	7,807	7,688
60-64	15,230	7,649	7,581
65-69	13,139	6,309	6,830
70-74	11,381	5,364	6,017
75-79	9,186	4,113	5,073
80-84	6,950	2,748	4,202
85-89	4,096	1,354	2,706
90+	2,089	512	1,577
All Ages	**308,063**	**151,592**	**156,471**

Note. 2011 Census Population Estimates – Quinary age groups and gender (Office for National Statistics, 2011c)

The mean age of the Sandwell population is 37.4 years (Median = 36.0 years) and females account for approximately 50.8% of the Sandwell population (ONS, (2011b); Table 4). The age profile of the Sandwell population is younger in comparison to the Black Country and national averages with more than one in five of Sandwell's population aged 0-14 compared with 17.6% in England and Wales (Office for National Statistics, 2011b).

3.2.3 Ethnicity

The distinctive cultural mix of Sandwell is reflected in the high proportion of men and women from Black and Minority Ethnic (BME) Groups (30.1%), which is above the regional average (17.3%) and English average (14%). The largest BME groups in the borough are people of Indian origin (10.2%) and Pakistani origin (4.5%) (ONS, Census (2011b); Table 5).

Table 5. *Ethnic profile of the Sandwell population*

	Persons (no.)	**Percentage (%)**
White: English/Welsh/Scottish/Northern Irish/British	202,822	65.8
White: Irish	2,045	0.7
White: Gypsy or Irish Traveller	141	0.0
White: Other White	10,463	3.4
Mixed/multiple ethnic group: White and Black Caribbean	6,163	2.0
Mixed/multiple ethnic group: White and Black African	515	0.2
Mixed/multiple ethnic group: White and Asian	2,043	0.7
Mixed/multiple ethnic group: Other Mixed	1,478	0.5
Asian/Asian British: Indian	31,400	10.2
Asian/Asian British: Pakistani	13,952	4.5
Asian/Asian British: Bangladeshi	6,588	2.1
Asian/Asian British: Chinese	839	0.3
Asian/Asian British: Other Asian	6,479	2.1
Black/African/Caribbean/Black British: African	4,396	1.4
Black/African/Caribbean/Black British: Caribbean	11,382	3.7
Black/African/Caribbean/Black British: Other Black	2,579	0.8
Other ethnic group: Arab	901	0.3
Other ethnic group: Any other ethnic group	3,877	1.3
All categories: Ethnic group	**308,063**	**100.0**

3.2.4 Deprivation

The Index of Multiple Deprivation (IMD) 2010 (Department of Communities and Local Government, 2010) is a composite measure of deprivation of local communities, known as Lower Super Output Areas (LSOA, see glossary). The IMD comprises seven

domains (see glossary) and for each domain, the individual LSOAs are scored and ranked nationally.

Overall, Sandwell is ranked 12th most deprived out of 354 authorities in England, with 30.5% of Sandwell's 187 LSOAs falling into the most deprived 10% nationally in 2010. A further 28% of LSOAs fall into the most deprived 10-20%, meaning approximately 60% of Sandwell LSOAs lie in the most deprived quintile according to national rankings. This is the highest share in the region (West Midlands) with Sandwell facing higher levels of deprivation when compared with its neighbours. Wolverhampton is ranked 21st, Walsall 30th and Dudley 104th most deprived local authorities in England (IMD, 2010). Figure 5 illustrates the IMD (2010) for Sandwell by LSOA.

When examining the individual domains of the IMD, Sandwell compares poorly with the rest of England in relation to the Education, Skills and Training domain, where nearly two-thirds of the borough is in the most deprived fifth nationally. Over half of the borough is in the most deprived fifth on the Employment, Income, Health and Living Environment domains. However, Sandwell performs better on both the Barriers to Housing and Services and Crime domains, with less than 20% of the borough amongst the most deprived in the country (Department of Communities and Local Government, 2010). This is likely to reflect the largely urban character of the area such that access to services compare favourably with more remote, rural LSOAs, despite the general deprivation.

So overall, compared to national and regional averages, the Sandwell population is younger, more ethnically diverse and far more deprived. As expected, this kind of deprivation profile is associated with poor health outcomes on a range of outcomes, which are discussed next.

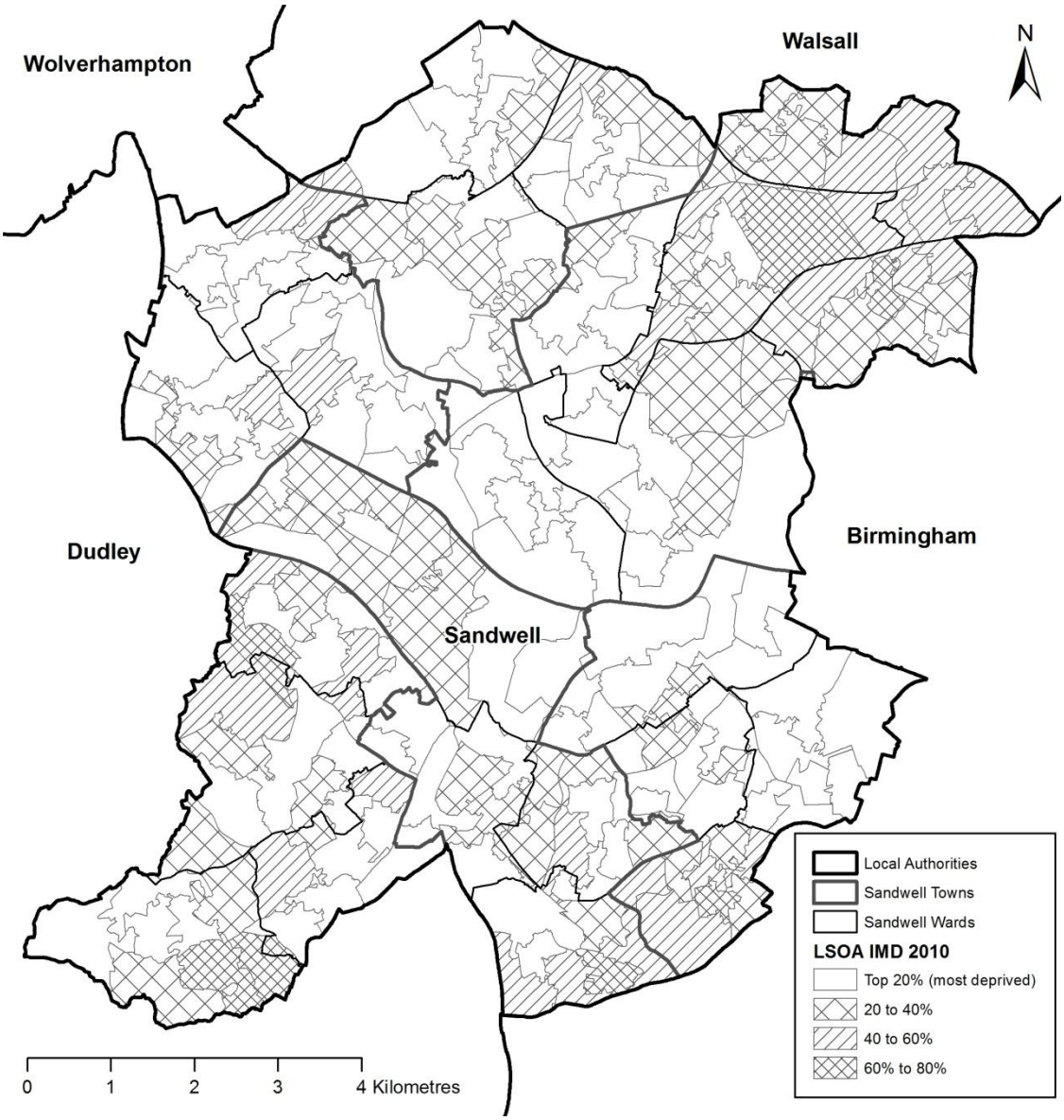

Figure 5. *A map to show the Indices of Multiple Deprivation (2010) for lower super output areas of Sandwell*

3.2.5 Health Profile

3.2.5.1 Life Expectancy

In absolute terms, health in Sandwell has been improving over time, though at a slower rate than the country as a whole. The health of people in Sandwell is generally worse than the England average with life expectancy for both men and women lower than the England average. For males, life expectancy in Sandwell is 75.5 years compared to the

national figure of 78.6 years. For females, life expectancy in Sandwell and England is 80.8 years and 82.6 years, respectively (Department of Health, 2012).

There are also marked health inequalities in life expectancy across Sandwell. Life expectancy is 9.6 years lower for men and 6.4 years lower for women in the most deprived areas of Sandwell than in the least deprived areas (Department of Health, 2012). Figure 6 demonstrates the differences in life expectancy across the six towns of Sandwell, by gender.

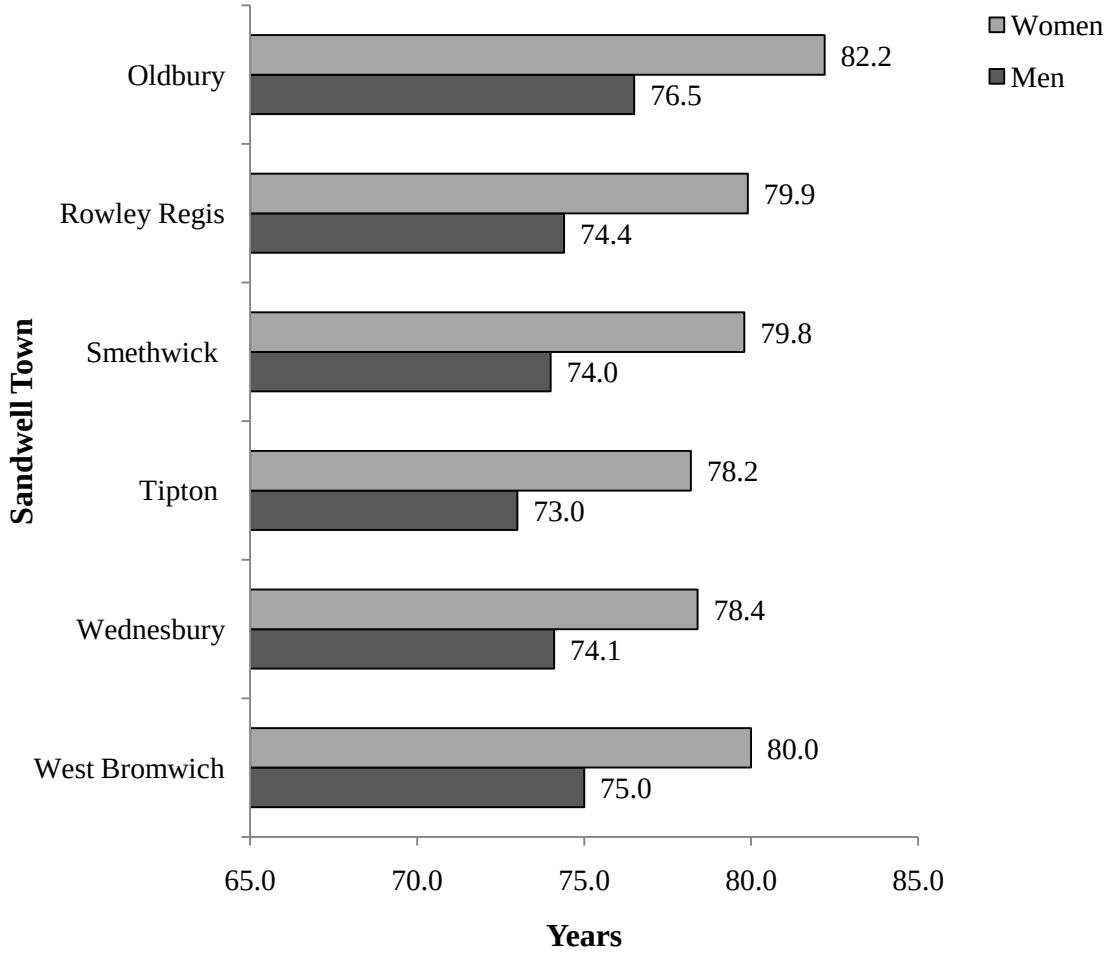

Figure 6. *Life expectancy across the six towns of Sandwell, according to gender. Note. Sandwell Primary Care Trust (2008a)*

3.2.5.2 Limiting Long Term Illness

The 2011 census found that 20.9% of Sandwell residents (more than 60,000) reported having a limiting long term illness, health problem or a disability which limited their

daily activities or work. This compares with a regional average of 19.2% and average of 17.9% for England and Wales (Office for National Statistics, 2011b).

3.2.5.3 Major Causes of Death

The main causes of death in Sandwell are circulatory disease and cancer, particularly lung cancer (Figure 7). The primary cause is cardiovascular disease (CVD), which accounts for two out of every five deaths (or 38.25% of deaths) (Office for National Statistics, 2007). Coronary heart disease (CHD) is the largest contributor to CVD in Sandwell, accounting for 47% of CVD deaths between 2002 and 2006 (18.3% of all deaths), and a further 30% of circulatory related deaths were caused by stroke (11.4% of all deaths). In Sandwell, men are twice as likely to die from CHD as women and one in three people develop cancer during their lives, and one in four die from cancer (Office for National Statistics, 2007). Other causes of deaths are respiratory disease (14% of deaths), alcohol (2% of deaths) and accidents in the population aged over 64 years (1% of all deaths registered in Sandwell between 2002 and 2006) (Sandwell Primary Care Trust, 2008a).

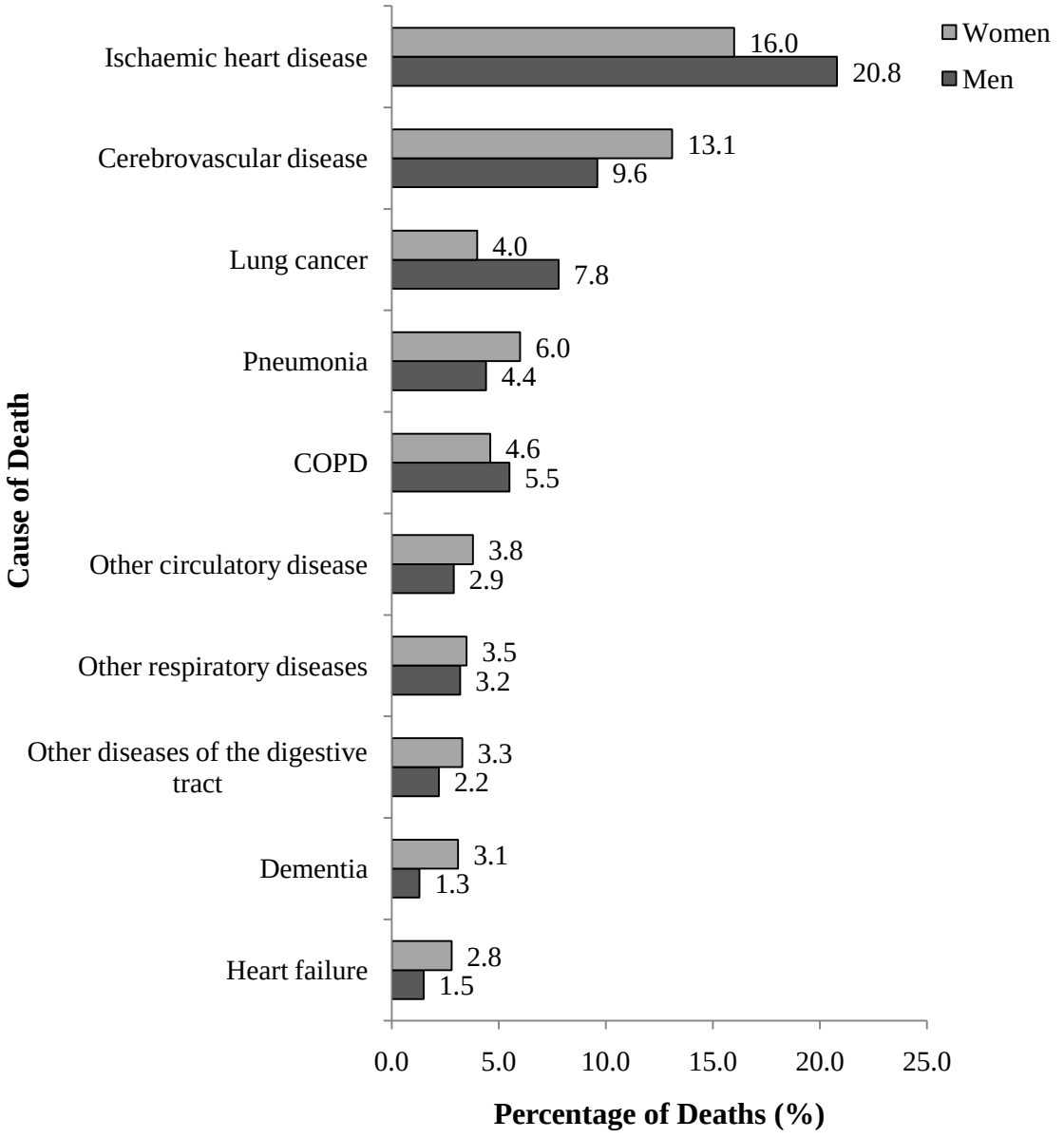

Figure 7. *Major causes of death by gender, for all ages in Sandwell from 2002-2006. Note. ONS Death Extract 2002-2006, Sandwell PCT (2008a)*

3.2.5.4 Obesity

According to modelled estimates, based on individual-level data from the Health Survey for England, 28.7% of the Sandwell population aged 16+ are classified as obese (body mass index (BMI) of 30 or more) compared with 26.4% in the West Midlands and 24.2% in England (National Centre for Social Research, 2010). The UK Government's Foresight programme has predicted that by 2050, 60% of men, 50% of women and 25% of children under 16 in Britain could be obese (Foresight, 2007). The burden of disease associated with Foresight's predicted rise in obesity could increase levels of diabetes by

more than 70%, stroke by 30% and coronary heart disease by 20%. This is likely to affect areas such as Sandwell disproportionately as current evidence suggests that existing inequalities will not improve.

3.2.6 Health Behaviour

Given the focus of the current research, this section will focus on physical activity with brief consideration to other health behaviours including smoking, diet and alcohol consumption. It was not deemed relevant to provide comprehensive information on all health behaviours in order to provide a context relevant to this research.

3.2.6.1 Physical Activity

As reported in Chapter 1, Section 1.5, the Active People Survey 5 (2010-11) found that the people of the West Midlands region are among the most inactive in the country. Within this area, Sandwell recorded the lowest percentage (15.5%) of individuals taking part in sport and active recreation (30 minutes on 3 or more days a week). This is markedly lower than the national figure of 21.0%. Additionally, 60.1% of adults in Sandwell have not taken part in *any* moderate intensity sport and active recreation of 30 minutes duration in the last four weeks (Sport England, 2011).

Table 6 presents information relating to a Health Impact of Physical Inactivity (HIPI) produced by the Network of Public Health Observatories (Public Health England, 2013). HIPI was developed to estimate how many cases of certain diseases could be prevented in each local authority in England if the population aged 40-79 were to engage in recommended amounts of physical activity (Chief Medical Officers of England, 2011). HIPI uses estimates of local levels of physical activity from the Sport England Active People Survey (5, 2010-2011) (Sport England, 2011). It models the potential benefit from increased levels of physical activity for each local authority. This is pre-calculated to show the health impacts if 100%, 75%, 50% or 25% of the local population undertake the UK Chief Medical Officer's recommended levels of physical activity (Chief Medical Officers of England, 2011).

As Table 6 shows, 263 deaths per years are estimated to be preventable if 100% of the population met the current recommended physical activity guidelines. With this figure

reducing to 21 deaths that are estimated to be preventable if a quarter of the population were physically active at recommended levels.

Table 6. *Estimated cases of deaths per year prevented by physical activity by hypothetical level of physical activity in the population of Sandwell (ages 40-79)*

Indicator	Latest Annual Figure	Preventable if 100% active	Preventable if 75% active	Preventable if 50% active	Preventable if 25% active
		N cases	N cases	N cases	N cases
Total Deaths (2007-11)	1,415	263	183	102	21
Coronary Heart Disease (emergency hospital admissions) (2006-10)	126	26	18	10	2
Breast Cancer (new cases) (2005-09)	166	35	24	14	3
Colorectal Cancer (new cases) (2005-09)	126	26	18	10	2

Note. Total deaths, latest annual figures: estimated number of deaths in persons, 40-79 years, 2010, based on deaths, persons, 40-79 years, registered in 2007-2011. *Source:* Health Impact of Physical Inactivity (HIPI) (Public Health England, 2013).

Therefore, the case for trying to improve health through the implementation of physical activity interventions in Sandwell is clear.

3.2.6.2 Smoking

Smoking is the single greatest cause of preventable illness and premature death in the UK (Wanless, 2004). Figures from the report *Statistics on Smoking: England 2012* showed that in 2010, smoking contributed to over 79,400 deaths per year, accounting for 18% of all deaths of adults aged 35 and over (The Health and Social Care Information Centre (HSCIC), 2012). It is also estimated that around 5% (405,900) of all hospital admissions in England among adults aged 35 and over in 2008/2009 were attributable to smoking.

Using data from the Integrated Household Survey it is estimated that 21.3% of the population in Sandwell smoke. This is higher than the estimated proportion in England (20.7%) and higher than the West Midlands (20.6%) (Office for National Statistics, 2011a).

3.2.6.3 Diet

Poor diet and nutrition are recognised as major contributory risk factors for ill health and premature death (Allender, et al., 2007). Estimated levels of 'healthy eating' (reaching the recommended five portions per day) in the Sandwell adult population is worse than the national average, 20.6% in Sandwell compared to 28.7% in England (Department of Health, 2012).

3.2.6.4 Alcohol

Excessive consumption of alcohol is a major preventable cause of premature mortality with alcohol-related deaths accounting for almost 1.5% of all deaths in England and Wales in 2011 (Office for National Statistics, 2013). In 2008/09, 18.5% of Sandwell residents aged 16 years and over were classified as increasing and higher risk drinkers, which is lower than the England average (22.3%) (Department of Health, 2012). Increasing and higher risk drinkers (who are at an increasing or higher risk of alcohol-related illness) are defined as: men who regularly drink more than 3 to 4 units a day (increasing risk) or more than 8 units per day (higher risk); women who regularly drink more than 2 to 3 units a day (increasing risk) or more than 6 units per day (higher risk levels) (North West Public Health Observatory, 2011).

This section has shown that the health profile of the Sandwell population is generally worse than the national average for a range of non-communicable diseases and indicators. This evidence, along with existing data relating to the health behaviours of Sandwell residents suggests that a sustained effort for improvement in health-related behaviours is required.

3.3 Walk to Beijing – Background and Rationale

The health benefits of physical activity are well documented and the fact that a large proportion of adult men and women are inactive, promoting regular physical activity is a public health priority. Currently, only 32% of adults in England take 30 minutes of moderate exercise five times a week, as recommended by health professionals. Sport England's goal is to increase this number by 1% per annum with the Government setting a target of 70% of the population being physically active by 2020 (Department of Culture Media and Sport, 2002).

In response to the national and local levels of physical inactivity, a Local Area Agreements (LAA) was established in order to tackle key priorities in the Sandwell area. The physical activity LAA target aimed to increase the percentage of the adult population participating in a least 30 minutes moderate intensity sport and recreational activity on three or more days of the week from 14.9% in 2005/2006 to 15.5% in 2010/2012, as defined by the Sport England Active People Survey (Sport England, 2011).

Sandwell Primary Care Trust (PCT) developed a 'Vision' for Sandwell that looked to significantly reduce the major health problems experienced by its residents;

"There will be a significant improvement in the health and well-being of Sandwell's communities over the next five years. Our aim is to reduce health inequalities in Sandwell by narrowing the gap between life expectancy for men and women in Sandwell and the average for England by 15%. This would lengthen lives for men from 74.5 years to 76 years and for women from 80 to 81 years" (p. 9) (Sandwell Primary Care Trust, 2008b).

There was, therefore, a need to develop and implement effective interventions to promote the adoption and maintenance of an active lifestyle. Physical activity promotion to a large proportion of the Sandwell population is required in order to meet LAA targets by 2010, to improve the health of individuals and reduce inequalities in health in the area.

The WTB concept related to the Olympic Games held in Beijing in 2008. It provided participants with a goal of collectively walking the distance to Beijing before the games began by incorporating physical activity into their daily lives. A lifestyle approach to

physical activity was promoted, with greater emphasis on being more active during everyday life through, for example, walking, gardening and taking the stairs, and minimising dependence on leisure facilities.

The Sandwell PCT Physical Activity team were concerned that a large proportion of their current services were aimed at helping people to get active. This premise pre-supposes that their clients are already sufficiently motivated to make this behaviour change. The purpose of this research was, in collaboration with Sandwell PCT's Physical Activity team, to investigate the effectiveness of using a financial incentive to engage with sedentary individuals who would not normally be interested in their current service provision. The use of a financial incentive in the WTB programme also related to the concept of the Olympic Games as the financial incentive offered was in the form of 'bronze', 'silver' or 'gold' rewards and the level of reward allocated was dependent upon levels of health improvement achieved.

Sandwell PCT's Physical Activity Team was responsible for the development, delivery and management of the WTB intervention. The following section will provide an overview of the study design and detail the different components of the WTB evaluation.

3.4 Overview of the Study Design

So far, this chapter has described the Sandwell context and presented a rationale for the WTB intervention. The following section details the WTB evaluation approach. As noted in Chapter 1, the evaluation comprised analysis of: quantitative data on participant outcomes (Chapter 4); qualitative data exploring both participant outcomes and processes (Chapter 5); and in-depth case studies of two individual's using a mixed-methods approach (Chapter 6). Therefore, Chapter 4 presents details relating to *'if'* the intervention was effective, Chapter 5 presents the *'why'* and *'how'* the intervention impacted participant outcomes and Chapter 6 seeks to provide a longer-term and more individually-based insight into experiences of the WTB intervention. Combining multiple methods allowed a comprehensive account of WTB impact on participant experiences and outcomes. The following section discusses the use of a mixed-methodology in evaluating the WTB intervention before the presentation of each chapter in turn and a discussion of the overall findings and conclusions drawn.

3.4.1 Using a Mixed Methods Approach

Within the research literature there is debate surrounding the use of mixed designs (Gelo, Braakmann, & Benetka, 2008). Study designs combining qualitative and quantitative methodologies can be embraced by some researchers while, for others, mixed study designs are incommensurate with their ontological and epistemological positions. Epistemological arguments have implications for both qualitative and quantitative researchers, including choice of research question, study design and data collection techniques selected, and the presentation of findings (Johnson, Onwuegbuzie, & Turner, 2007).

Traditionally, psychology has been dominated by a positivist epistemology. Positivism is a branch of philosophy where reality is assumed to be observable and is measureable using properties that are independent of the researcher and the instruments used to gather data. Essentially, within this approach, knowledge is objective and quantifiable. Positivism is concerned with uncovering truth and presenting it by empirical means (Henning, Van Rensburg, & Smit, 2004). A positivist approach to research is based on empiricism and implies that a direct link exists between the phenomenon under investigation and participants' understandings of it (Willig, 2008) and that it can be accessed through rigorous research and statistical analysis (Yardley & Marks, 2004). A positivist epistemology implies that the researcher must be seen as impartial, unbiased and detached from personal involvement (Willig, 2008). Quantitative research methods attempt to maximise objectivity and replicability of findings. Quantitative methods are often described as deductive in nature; inferences from tests of statistical hypotheses lead to general inferences about characteristics of a particular population (Denzin & Lincoln, 1998).

Researchers frequently pose questions that cannot be examined sufficiently using the positivist approach (Chamberlain, 2004). Experimental research is useful for investigating certain types of research questions, such as, *if* an intervention works, however, it provides limited information about *why* it works. There has been increasing interest in participants' perceptions and experiences; attempting to reflect their reality and their lived world from their individual perspectives (Ashworth, 2003). Qualitative research allows the investigator to draw meaning from the participants' perceptions and experiences and moves beyond a focus on measurement, frequency, causation, objectivity and the removal of context (Willig, 2008). Qualitative research approaches

have developed out of a constructivist philosophy. Within this position, humans construct knowledge out of their somewhat subjective engagement with objects in their worlds. The basic contention of the constructionist argument is that reality is socially constructed by and between the persons who experience it (Gergen, 1999). Qualitative research methods focus on discovering and understanding the experiences, perspectives and thoughts of individuals being studied from their point of view (Todd, 2004). Qualitative researchers also acknowledge their own position in the research process and in the construction of knowledge. Linked to this is the reflective quality of qualitative research which is not present in quantitative research.

The epistemological stances underpinning quantitative and qualitative research also differ according to how quality is assessed. Traditionally, in quantitative research, quality is judged on criteria of internal and external validity and reliability, all terms stemming from a positivist epistemology where reality is assumed to be observable objectively (Henning, et al., 2004). The validity and reliability of qualitative research is frequently debated within the literature and discussion centres around the appropriateness and relevance of assessing qualitative research using terms associated with a positivist epistemology (Guba & Lincoln, 1989). Alternatively, issues of trustworthiness, credibility, transferability and confirmability are highlighted as key considerations in the interpretivist paradigm (Richards, 2009). Yardley (2000) also highlights the diversity of methodological approaches in qualitative research and the difficulties this presents for quality assessment. Therefore, according to Yardley (2000), attempting to evaluate the validity of qualitative methods using fixed criteria would be inappropriate. The underpinning philosophies of qualitative traditions highlight the fact that experiences and our understanding of them are subjective and are derived from the construction of meaning by the researcher and participant. Yardley (2000) proposes that a number of factors need to be considered when evaluating the quality of qualitative research methodologies, including: sensitivity to context; commitment (to immersion in the data) and rigour (completeness of analysis); transparency and coherence (of methods and data collection, clarity and power of description and fit between theory and methods); and impact and importance (theoretical, socio-cultural or practical).

Some researchers would contest that combining both quantitative and qualitative analyses in one study does not serve either paradigm very well (Munroe-Chandler, 2005). However, others, state that a mixed methods design allows for the triangulation of findings to establish the consistency of the results, clarify the findings from one

method to another, further develop methods, and provide new insights and depth to the findings (Greene, Benjamin, & Goodyear, 2001). Denzin and Lincoln (1998) state, "the use of multiple methods (or triangulation) reflects an attempt to secure in-depth understanding of the phenomenon in question" (p. 4).

Closer collaboration between quantitative and qualitative researchers is advocated by a number of health psychologists, such as Thompson et al. (2002) and Smith et al. (1997). Some psychologists suggest that quantitative research may operate more successfully at the 'macro-level' of constructing and testing psychological models and such work can be enhanced by 'micro-level', qualitative research. By highlighting individuals' subjective experiences, the latter may reveal previously unrecognised processes that are at work within the macro level models (Onwuegbuzie & Leech, 2004).

One argument proposed by supporters of mixed methods approaches is that they address much more comprehensive research purposes than do quantitative or qualitative research alone (Newman, Ridenour, Newman, & DeMarco, 2003). Greene, Caracelli, and Graham (1989) categorised the following five general purposes of mixed methodological studies: triangulation (i.e., seeking convergence and corroboration of findings from different methods that study the same phenomenon); complementarity (i.e., seeking elaboration, illustration, enhancement, and clarification of the findings from one method with results from the other method); development (i.e., using the findings from one method to help inform the other method); initiation (i.e., discovering paradoxes and contradictions that lead to a re-framing of the research question); and expansion (i.e., seeking to expand the breadth and range of inquiry by using different methods for different inquiry components).

Mixed methods researchers are more able to utilise quantitative research to inform the qualitative portion of research studies, and vice versa. For example, the inclusion of qualitative data can help investigators to explain relationships emerging from quantitative data. Similarly, the inclusion of quantitative data can help compensate for the fact that qualitative data typically cannot be generalised (Onwuegbuzie & Leech, 2004). As such, mixed methods optimally involve the combining of methods that have complementary strengths and non-overlapping weaknesses; this is known as the fundamental principle of mixed methods research (Johnson & Turner, 2003)

The use of mixed methods in health care research also has been highlighted with qualitative research being increasingly recognised as having a distinctive and important

contribution. Not only is it capable of being used as a methodologically sufficient approach in its own right it can be used as a precursor to quantitative studies, during or after trials to explain processes and outcomes, and as a means of enhancing the link between evidence and practice (Dixon-Woods, Fitzpatrick, & Roberts, 2001). Considering findings from both methodologies offers the prospect of testing the quantitative outcomes of psychological models and interventions in tandem with gaining improved understanding of the mechanisms underlying the observed results (Gelo, et al., 2008).

The remainder of this chapter will summarise the different WTB evaluation components and the role of the researcher in their development is presented in Chapter 7, Section 7.7.

3.4.2 A Quantitative Methodological Approach: Chapter 4

The study presented in Chapter 4 examined the benefits of a scheme offering a financial incentive, in combination with other intervention components, to promote positive health behaviours, specifically physical activity, in the area of Sandwell, West Midlands. An outcome evaluation was conducted employing a one-group, pre-, post-intervention, design. A quantitative methodology was used to:

(1) Determine the impact of a financial incentive on uptake and attendance at a health assessment (through pre- and post-intervention measures); and

(2) Compare changes in health related behaviour (physical activity), physiological measures of risk, and perceived quality of life from baseline to follow-up.

The outcome evaluation of the WTB intervention was carried out using secondary data collected by Sandwell PCT's physical activity team and provided to the researcher for analysis.

3.4.3 A Qualitative Methodological Approach: Chapter 5

Chapter 4 of the thesis presents an outcome evaluation of the WTB intervention. However, the quantitative aspects of this research alone would not enable an accurate effective assessment of the efficacy of this intervention. A mixed methods design allowed for the triangulation of findings to establish the consistency of the results,

clarify the findings from one method to another, further develop methods, and provide new insights and depth to the findings (Greene, et al., 2001). Chapter 5 reports a process evaluation concerned with exploring participants' experiences, attitudes and motivations towards physical activity, incentivised health schemes, the role of financial incentives in behaviour change and WTB intervention participation. Thematic Analysis (Boyatzis, 1998) was used to analyse primary data collected by the researcher via semi-structured interviews and focus groups.

3.4.4 A Mixed Methods and Case Study Approach: Chapter 6

In Chapter 6, a mixed methods, case study approach was used with the purpose of combining quantitative and qualitative research methods in order to investigate the topic under study. The rationale for using a mixed methodology in this research, and this chapter specifically, was to: seek convergence and corroboration of findings from different methods i.e., triangulation; and seek elaboration, illustration, enhancement, and clarification of the findings from one method with results from the other method, i.e., complementarily (Greene, et al., 2001). To expand upon quantitative (Chapter 4) and qualitative (Chapter 5) investigations, Chapter 6 presents the results from two in-depth case studies to explore further the sustainability of behaviour change in the WTB intervention at an individual level using a mixed methods design. Quantitative data collected as part of the outcome evaluation of the WTB intervention (Chapter 4) was used in conjunction with qualitative data collected using semi-structured interviews and analysed using Interpretative Phenomenological Analysis (IPA) (Smith, 1996). Data collected via semi-structured interviews at six-months (presented in Chapter 5) were re-analysed using Interpretative Phenomenological Analysis (IPA) and additional quantitative (collected by Sandwell PCT) and qualitative data (collected by the researcher) were collected at 12-months for the purpose of this case-study research. All qualitative data were collected by the researcher.

The combination of quantitative, qualitative and longitudinal case study methods provided a unique, in-depth and comprehensive insight into this type of financial incentive scheme in promoting physical activity in two individuals.

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Chapter 4

This chapter has presented the background, context and rationale for the WTB intervention and has built upon information presented in Chapter 1. The following chapter describes the design, methods of investigation and the findings from an outcome evaluation of the WTB intervention.

Chapter 4: An Outcome Evaluation of the Walk to Beijing Intervention

4.1 Introduction

This chapter reports the effectiveness of the Walk to Beijing (WTB) intervention using a one-group, pre-, post-intervention, design. The objectives of this study were:

1. To determine the impact of a financial incentive on uptake and attendance at a health assessment (through pre- and post-intervention measures).

2. (a) To compare changes in health related behaviour (physical activity) (b) physiological measures of risk, and (c) perceived quality of life from baseline to follow-up (three- and six-months).

This chapter describes the design of the WTB intervention and the procedures followed for its implementation. Intervention materials and outcome measures selected are described and the statistical methods employed to compare pre- and post-intervention measures are detailed. Participant characteristics and results of pre- and post-intervention comparisons for the selected outcome measures are also reported in this chapter. Findings are further discussed in Chapter 7.

Secondary data, provided by Sandwell PCT was used in this outcome evaluation of the WTB intervention. Quantitative data was collected by health assessors (employed by Sandwell PCT) and data was collated, stored and inputted into a database by Sandwell PCT. Further detail regarding the data collection procedure is provided in Section 4.2.4. Ethical approval was granted by Staffordshire University's Ethics committee for the completion of this research (Appendix 2).

4.2 Methods

The methods section details: the study design; participant recruitment; WTB intervention structure; outcome measures selected; and methods of data analysis that were conducted.

4.2.1 Design

The original study employed an experimental design with participants randomly allocated to one of two groups;

Group A: Received a pedometer, health assessment, financial incentive, and *tailored* health advice including full information about the local health walks programme in addition to other positive health behaviour programmes delivered by Sandwell PCT.

Group B: Received a pedometer, health assessment, financial incentive and basic health advice.

However, in practice, independent observations of the health assessments (by the researcher) and discussions with individuals involved in the implementation and delivery of the programme (health assessors and Sandwell PCT staff) revealed no differences in the delivery of group A and group B conditions. Section 4.2.4 details the management and delivery of the WTB intervention including, information relating to the recruitment, training and role of the health assessor. Observations of 10 health assessments carried out by the researcher revealed that brief health advice was provided to participants in both conditions (i.e., following Group A's delivery protocol with brief, not tailored advice). Discussions took place between the researcher (and principal supervisor) and Sandwell PCT's Physical Activity Team and agreement was made to continue to deliver the intervention following Group A's delivery protocol with brief, not tailored advice and to conduct the evaluation using a one-group, pre-, post-intervention, design. This will be presented in this thesis (i.e., no group A vs. group B comparisons).

Ideally, the design of the intervention would have involved the randomised use of financial incentives between an intervention and a control group (no incentive). However, this was not possible due to the lack of flexibility in the design developed by Sandwell PCT and issues with delivery. A pragmatic approach was therefore used in the evaluation of this research project. This will be further discussed in Section 7.8.2.

4.2.2 Recruitment

Members of Sandwell PCTs Physical Activity Team were responsible for advertising and promoting the WTB project. Opportunistic sampling was used to recruit participants from the Sandwell population (n = 308,063 (Office for National Statistics, 2011b)). The programme was publically launched in January 2007 via an information event at a supermarket centrally located in West Bromwich. This event involved the placement of health stands relating to services delivered by Sandwell PCT within the supermarket. A former West Bromwich Albion football player launched the project with an interview conducted by a local councillor with local press coverage. Participant recruitment for the purpose of this evaluation was concluded in March 2008.

An information leaflet containing a registration form was used to recruit participants (Appendix 3). This contained information relating to the aims of the WTB project, including what was required of participants and details of the financial incentive. The leaflet also included a pre-paid reply slip and potential recruits were asked to provide their name, address, postcode and contact telephone number.

The information leaflet (and registration form) was distributed to local community groups and GP practices and were displayed in public libraries and local leisure facilities. Participant recruitment drives were undertaken periodically to maintain interest via targeted leaflet drops and advertisements placed in a local evening newspaper and a free paper (delivered to every residential address).

Once Sandwell PCT received this registration form, via the pre-paid reply slip, the participant's information was entered into the project database.

4.2.3 Participants

In total, 3006 participants registered with the project.

Intervention inclusion criteria were:

- Aged 16 years and above
- Resident of Sandwell *or* registered with a General Practitioner (GP) in Sandwell area.

Exclusion criteria included:

- Symptomatic Coronary Heart Disease or asymptomatic post-myocardial infarction and have not undergone coronary rehabilitation programme
- Uncontrolled hypertension >160/100mmHg
- Unstable diabetics (i.e., cannot exercise below 5 or above 17mmols/l)
- Uncontrolled or acute heart failure
- Ventricular or aortic aneurysm
- Uncontrolled tachycardia (>100bpm at rest)
- Unstable or recently diagnosed angina (last three months)
- Any medical contraindications for exercise (as measured by the Physical Activity Readiness Questionnaire (PAR-Q)). If any contraindications were identified participants were allowed to continue if medical advice had been sought from their GP.

4.2.4 Intervention Procedure

The WTB intervention involved participants undertaking health assessments at two time points (baseline and three-months) with the option of one further follow-up (six months; 12-weeks post-intervention) (Figure 8). Change in outcome measures taken during health assessments at baseline and three-months formed the basis for the award of a financial incentive. This section will describe the: management and delivery of the intervention; content of and delivery protocol for each health assessment; and the type, level and award criteria for the financial incentive.

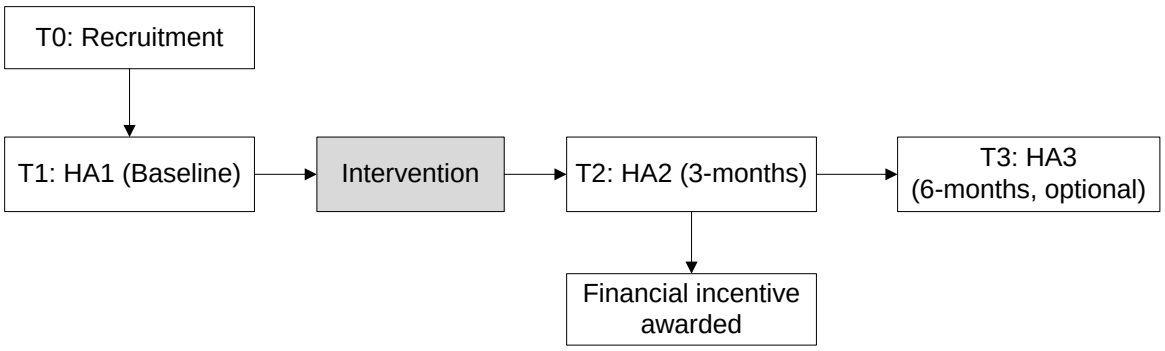

Figure 8. *WTB intervention structure. Note. HA = health assessment*

4.2.4.1 Management and Delivery

The WTB intervention was managed and delivered centrally by Sandwell PCT's Physical Activity Team. Members of this team were responsible for contacting registered participants and organising baseline and follow-up health assessments. Once registered, participants were contacted within two weeks and invited to undergo a confidential health assessment, lasting approximately 30 minutes.

Health assessments took place in easily accessible community locations, such as, leisure facilities, community centres and public venues (e.g. public libraries) in various locations across Sandwell. Health assessments were conducted by five (3 female, 2 males) qualified health and fitness assessors, recruited from the local area and employed by Sandwell PCT. All assessors had prior experience of conducting health assessments e.g. through GP referral systems. All health assessors participated in a training workshop in order to standardise the delivery of the WTB assessments. This was also facilitated through the use of a guidance pack consisting of information regarding the order in which measurements and data were to be collected, and 'cue cards' explicitly stating what was to be relayed to the participants by the health assessors (Appendix 4).

4.2.4.2 Financial Incentive

Incentives were given in the form of vouchers; leisure (Love2play), high street (Love2shop) or supermarket vouchers (ASDA and Sainsbury's). Rewards were linked to the concept of the Olympics, with bronze, silver or gold awards available. Table 7 shows the criteria participants were required to meet in order to receive a gold, silver or bronze award.

Table 7. *Criteria for rewards*

Bronze (£10)	Silver (£20)	Gold (£40)
Attendance at Health Assessment 1 and 2, Submission of pedometer report card, No improvement in any of the health measures.	Attendance at Health Assessment 1 and 2, Submission of pedometer report card, An improvement in 1-2 of the health measures.	Attendance at Health Assessment 1 and 2, Submission of pedometer report card, An improvement in $\geq$ 3 of the health measures,

Therefore, participants received a minimum £10 reward for taking part in the study. Rewards were allocated to and distributed via recorded delivery to participants' registered address. Participants only received a reward following completion of their second health assessment. An additional reward was not offered if participants wished to take part in a further (optional) health assessment at six-months (12-weeks post-intervention).

4.2.4.3 Health Assessment One

The first health assessment involved examining participants' physical activity readiness using the PAR-Q, to identify medical contraindications for physical activity. Participants with medical contraindications were advised to visit their GP to seek advice before continuing.

The following measurements were then taken (in this order):

Objective measures:

1. Blood pressure (x3 and averaged)
2. Height (cm) (with no shoes) using a stadiometer,
3. Weight (kg) (with no shoes)
4. Waist circumference (cm)
5. Hip circumference (cm)

BMI and waist-hip ratio (WHR) were then calculated and reported to participants.

Subjective measures:

6. Transtheoretical Model of Behaviour Change Question (TTM)
7. Theory of Planned Behaviour Questionnaire
8. EQ-5D (VAS) Health State
9. Short Form-12v2 (SF12v2)
10. Questions regarding participant's motivations / influences for taking part.

A detailed description of each outcome measure is provided in Section 4.2.5.

During this health assessment participants were issued with a pedometer and record card together with brief advice about how they could increase their lifestyle physical activity levels. In relation to the pedometer, participants were asked to wear the pedometer all

day (from waking until going to bed). Participants were also informed, in basic terms, how the pedometer worked, where it should be worn (close to hip on a belt or waist band) and how to reset it at the end of each day. Participants were also notified that the steps they took on a daily basis would be added together to calculate the total distance they had walked over the three-month period. Participants were told that this figure would then be collated with other participants residing in the same town and compared.

Participants were also provided with brief information regarding the financial incentive associated with the project. The following information was relayed:

"Rewards will be allocated in relation to the level of health improvement you make over the next three months. The difference will be taken from the measurements today compared with the measurements we take in three months. Even if you haven't made an improvement you will still be rewarded for attending your second assessment. Your reward will be £10, £20 or £40's worth of vouchers dependant on the level of improvement you make" (p. 12) (Appendix 4).

However, participants were not told the criteria they were to fulfil in order to qualify for each level of reward (gold, silver or bronze) (Table 7). During this baseline health assessment participants were also asked to report the extent to which (not at all; a little; a lot) intervention components influenced their decision to take part, including the: pedometer; reward; support; town competition; and link to the Olympic Games (Appendix 6).

In addition, participants also received information regarding the local health walks programme and other positive health behaviour programmes run by Sandwell PCT.

4.2.4.4 Health Assessment Two

After three-months, participants were asked to return for a reassessment. Three-month health assessments, where possible, were conducted in the same location and by the same health assessor. The objective and subjective measurements recorded at baseline were repeated (in the same order) and comparisons made by the health assessor. The value of the reward was based on the level of health improvement over the previous three-months. The level of improvement required was set by Sandwell PCT's Physical Activity Team (Table 7). During health assessment two, the assessor indicated which

reward the participant was eligible for, which was later sent to them via recorded delivery.

4.2.4.5 Health Assessment Three (Optional)

Upon completion of their second health assessment participants were invited to receive an optional follow-up health assessment at six-months (12-weeks post-intervention). However, no rewards were offered as an incentive during this period.

The protocol followed in health assessments one and two was repeated in health assessment three. However, during this health assessment participants were not required to submit a pedometer report card.

4.2.5 Outcome Measures

The independent variable in this study is time with primary comparisons being made between baseline and three-months and secondary comparisons between baseline, three- and six-months.

Participant stage of change was the primary outcome measure as identified by the Transtheoretical Model of Behaviour Change (TTM). Secondary outcome measures were objective measures of health status including: Body Mass Index (BMI) (calculated using measured height and weight); blood pressure; WHR; and waist circumference. Additional secondary outcome measures included perceived health status as measured by the EQ-5D (VAS) and the Mental Component Score (MCS) and the Physical Component Score (PCS) of the SF12v2 Health Survey. Theory of Planned Behaviour (TPB) constructs including: intentions; perceived behavioural control; attitudes; and subjective norm were also identified as secondary outcome measures. These primary and secondary outcome measures were the dependent variables.

Attendance at health assessment and pedometer count (at three-months) were also recorded. Each measure will be described in this section.

4.2.5.1 Dependent Variables: Primary Outcome Measure

Transtheoretical Model of Behaviour Change – Stage of Change

Intervention effectiveness was measured by the TTM (Prochaska & DiClemente, 1982), which is described in detail in Section 2.4.1. Briefly, in this model, individuals are classified in terms of readiness to change into five stages: "precontemplation" (no intention to change behaviour in the next six months); "contemplation" (intention to change in the next six months); "preparation" (intention to change in the immediate future); "action" (actively engaging in behaviour change, but for less than six months); and "maintenance" (robust behaviour change extending beyond six months). Stage of change for moderate exercise was assessed using a single question with a five-choice response format (Reed, Velicer, Prochaska, Rossi, & Marcus, 1997; Sarkin, Johnson, Prochaska, & Prochaska, 2001):

"Do you participate in regular moderate physical activity (e.g., brisk walking and cycling) five times a week for at least 30 min each time?"

Participants were asked to select one of five options regarding their intention to engage in regular moderate physical activity. The five choices were designed to classify participants into one of five stages, each relating to a specific stage of change (Table 8) (Sarkin, et al., 2001). The questionnaire can be found in Appendix 8.

Table 8. *TTM questionnaire responses and associated stage of change category*

Response	Stage of Change
1. No, and I do not intend to in the next 6 months	Precontemplation
2. No, but I intend to in the next 6 months	Contemplation
3. No, but I intend to in the next 30 days	Preparation
4. Yes, I have been, but for less than 6 months	Action
5. Yes, I have been for more than 6 months	Maintenance

The staging algorithm for moderate physical activity has been shown to have good concurrent and construct validity (Kosma & Ellis, 2010; Sarkin, et al., 2001; Schumann et al., 2002). In addition, construct validity has been demonstrated using measures that capture the constructs of decisional balance and self-efficacy for regular moderate exercise (Sarkin, et al., 2001). Related to decisional balance, the pros and cons of moderate physical activity also vary systematically across the stages of change in the

predicted fashion (Marcus, Rakowski, & Rossi, 1992a; Prochaska et al., 1994). Similarly, the patterns found across the stages of change have been shown to be consistent with the theoretical predictions of the TTM (Sarkin, et al., 2001). The algorithm has been shown to discriminate between those in Action and Maintenance from those in Precontemplation, Contemplation, and Preparation for the moderate intensity and strenuous-intensity categories (Sarkin, et al., 2001).

4.2.5.2 Dependent Variables: Secondary Outcome Measures

Body Mass Index

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as weight (in kilograms) divided by the square of height (in metres) (kg/m^2) (WHO, 2013). A recent combined analysis of 57 international prospective studies found that BMI is a strong predictor of mortality among adults. Overall, moderate obesity (BMI 30-35 kg/m2) was found to reduce life expectancy by an average of three years, while morbid obesity (BMI 40-50 kg/m2) reduces life expectancy by eight to ten years (Prospective Studies Collaboration, 2009). BMI is sex-independent and therefore figures in Table 9 apply to both males and females.

Table 9. *The International classification of adult underweight, overweight and obesity according to BMI.*

Classification	BMI (kg/m^2)		Risk of Comorbidities
	Principal cut-off points	**Additional cut-off points**	
Underweight	<18.50	<18.50	Low
Severe thinness	<16.00	<16.00	(but risk of other
Moderate thinness	16.00 - 16.99	16.00 - 16.99	clinical problems
Mild thinness	17.00 - 18.49	17.00 - 18.49	increased)
Normal range	18.50 - 24.99	18.50 - 22.99	Average
		23.00 - 24.99	
Overweight	≥25.00	≥25.00	Increased
Pre-obese	25.00 - 29.99	25.00 - 27.49	
		27.50 - 29.99	
Obese	≥30.00	≥30.00	

Obese class I	30.00 - 34-99	30.00 - 32.49	Moderate
		32.50 - 34.99	
Obese class II	35.00 - 39.99	35.00 - 37.49	Severe
		37.50 - 39.99	
Obese class III	≥40.00	≥40.00	Very Severe

Note. Adapted from WHO (1995), WHO (2000) and WHO (2004).

Although it is generally assumed that individuals with a BMI of 30 or above have excess adipose tissue in their body, BMI does not distinguish between weight associated with fat and weight associated with muscle. It also does not take account of the distribution of body fat. Other measures, in addition to BMI, would therefore be valuable in identifying individuals at increased risk from obesity-related illness due to abdominal fat. Two parameters identified to indicate abdominal fat include waist-hip ratio (WHR) and waist circumference.

Waist-hip Ratio and Waist Circumference

WHR is a measure of central obesity and is calculated by dividing the waist circumference by hip circumference. It has generally been accepted that a WHR higher than 0.85 in women and 1.0 in men indicates accumulation of abdominal fat and signifies a substantially increased risk of metabolic complications (Table 10) (WHO, 2000, 2008).

Waist circumference can also be used as an approximate index of intra-abdominal fat mass that correlates closely with BMI and WHR (Han, Van Leer, Seidell, & Lean, 1995; Lean, Han, & Morrison, 1995). Sex-specific waist circumference of greater than 80cm and 94cm for women and men, respectively, denote enhanced relative risk of metabolic complications associated with obesity (Table 10) (Han, et al., 1995; WHO, 2000, 2008).

Table 10. *World Health Organisation cut-off points and risk of metabolic complications*

Indicator	Cut-off Points	Risk of Metabolic Complications
Waist circumference*	>94cm (M); >80cm (W)	Increased
Waist circumference*	>102cm (M); >88cm (W)	Substantially increased
Waist-hip ratio (WHR)	≥1.00 (M); ≥0.85 (W)	Substantially increased

Note. M, men; W, women (WHO, 2000, 2008). *The identification of risk using waist circumference is population specific. Figures presented here represent risk of metabolic complications associated with obesity in Caucasians (Han, et al., 1995).

Blood Pressure

Hypertension represents a major public health concern due to its high frequency and concomitant risks of cardiovascular and kidney disease (Kearney et al., 2005). In the United Kingdom, an estimated 42% of people aged 35 to 64 have hypertension (Table 11) (Wolf-Maier et al., 2003), the prevalence of which increases progressively with age. Above-optimal blood pressure also confers excess cardiovascular disease risk (i.e., non-hypertensive individuals with a systolic BP of 120 to 139 mm Hg or diastolic BP of 80 to 89 mm Hg) (Vasan et al., 2001). Reduction of BP to optimal levels (<120 mm Hg systolic and <80 mmHg diastolic), control of hypertension, and prevention of the age-related increase in BP remain major public health priorities (Appel et al., 2003).

Table 11. *Classification of Blood Pressure for Adults 18 years or older*

Systolic BP (mm Hg)*	Category	Diastolic BP (mm Hg)*
	Blood Pressure	
< 120	Optimal	< 80
< 130	Normal	< 85
130-139	High Normal	85-89
	Hypertension	
140-159	Grade 1 (Mild)	90-99
160-179	Grade 2 (Moderate)	100-109
≥ 180	Grade 3 (Severe)	≥ 110
	Isolated Systolic Hypertension	
140 – 159	Grade 1	< 90
≥ 160	Grade 2	< 90

Note. Williams et al., (2004), NICE Guidance 127 (2011); *If systolic blood pressure and diastolic blood pressure fall into different categories the higher value should be taken for classification.

EQ-5D (VAS) Health State[2]

The EQ-5D visual analogue scale (VAS) is a generic health-related quality of life measure that requires participants to rate, on a scale of 0-100, how they feel at a specific time point. A value of 0 equals the worst possible health state and a value of 100 equals the best possible health state. This information can be used as a quantitative measure of health outcome as judged by the individual respondents (Appendix 7).

SF12v2 Health Survey

The SF-12v2 is another validated measure used to assess general health and well-being (Ware & Dewey, 2002). It contains a subset of 12 items from the SF-36 Health Survey which measures the same eight constructs (Ware, Kosinski, & Keller, 1996): physical functioning; physical (role); bodily pain; general health; vitality; social functioning; emotional (role); and mental health. Summed raw scores in the eight domains are transformed to convert the lowest possible score to zero and the highest possible score to 100.

The summary scales for mental (MCS) and physical (PCS) health and well-being are computed from the eight health domain scales. These scales are then standardised using means and standard deviations from the 1998 U.S.A general population. Subsequently, the eight scales are aggregated using weights from the 1990 general U.S.A population. These aggregated measures are then transformed to give a mean of 50 and a standard deviation (SD) of 10 in the 1998 U.S.A general population. Using the standard, U.S.A. derived scoring algorithms is reported to be appropriate in the U.K., based on evidence from evaluations using large, general population samples (Gandek et al., 1998). An advantage of this standardisation procedure is that it allows meaningful comparisons across different studies and countries to be made. Higher MCS and PCS summary scores therefore represent better health and well-being. The standard form SF-12v2 uses a time frame of the past four weeks. A full version of the questionnaire can be found in Appendix 9.

The SF12v2 Health Survey is a validated measure of generic health and well-being (Ware & Dewey, 2002) and reported reliability estimates for the summary scales are 0.89 and 0.86 for the PCS and the MCS respectively. For a description of the statistical

[2] www.euroqol.org

techniques employed to estimate reliability coefficients for the PCS and the MCS, see Ware (2005).

Theory of Planned Behaviour

The TPB (Ajzen, 1991) is a widely used theory to predict and explain behaviour (Armitage & Conner, 2000) and has been applied frequently to the understanding of physical activity. Again, this is detailed in Section 2.4.2. Briefly, the focal concept of the model is the intention construct which reflects a person's motivational orientation towards a given behaviour. This, in turn, is predicted by three components; attitude, subjective norm and perceived behavioural control.

The proximal predictors of behaviour from the TPB were measured at baseline and follow-up using items adapted from Armitage (2005) and included: behavioural intention, perceived behavioural control, subjective norm and attitude (Appendix 8).

Behavioural intention was measured on two bipolar (-3 to +3) scales with the following items: "I intend to participate in moderate physical activity in the future *(definitely do not – definitely do)*" and "I want to participate in moderate physical activity in the future *(definitely do not – definitely do)*". The mean of the items was used as a measure of behavioural intention

Perceived behavioural control was measured by averaging (using the mean) responses to four items: "I believe I have the ability to participate in moderate physical activity in the future *(definitely do not – definitely do)*"; "To what extent do you see yourself as being capable of participating in moderate physical activity in the future? *(incapable – capable)"*; "How confident are you that you will be able to participate in moderate physical activity in the future? *(not very confident – very confident)*"; "How likely is it that you will participate in moderate physical activity in the future? *(unlikely – very likely)*". All were measured on unipolar (+1 to +7) scales and the mean of the items were used to measure perceived behavioural control.

Subjective norm was operationalised using three items: "People close to me think I should participate in moderate physical activity *(disagree – agree)*"; "People who are important to me would … *disapprove of my participating in regular physical activity/ approve of my participating in moderate physical activity*"; "People who are important to me want me to participate in moderate physical activity in the future *(disagree –*

agree)". Responses to the subjective norm items were made on unipolar (+1 to +7) scales. The mean of the three subjective norm items was used in subsequent analyses.

For the measure of attitude, participants were presented with the item: "Overall, my attitude towards participating in moderate physical activity in the future is ...," which they were asked to rate on three bipolar (−3 to +3) semantic differential scales, anchored by the adjectives *negative – positive, anti – pro and bad – good.* The mean of these three items was used as a measure of attitude.

Good internal reliability has been demonstrated for each scale; behavioural intention, perceived behavioural control, subjective norm and attitude (Cronbach's alpha of 0.72 or above) (Armitage, 2005).

4.2.6 Sample Size Estimates and Power Analysis

In relation to the original pre-, post-intervention design with participants randomly allocated to one of two groups, the target for recruitment, as stipulated by Sandwell PCT was approximately 4000 participants over an 18-month period (or 2000 per group). This section will report sample size and power calculations relating to the original design. Although this design was not implemented, this section demonstrates that the adequacy of the recruitment target was considered and deemed reasonable. Following this, sample size and power calculations will be presented for the implemented, one-group, pre-, post-intervention design.

To evaluate the adequacy of this sample size, evidence was sought on the likely retention rates and proportions currently failing to achieve the government recommended levels of physical activity.

Harland et al. (1999) carried out 'The Newcastle exercise project', a randomised controlled trial of methods to promote physical activity in primary care. This compared various levels of physical activity intervention, several of which included the use of financial incentives, given in the form of leisure vouchers that could be exchanged for one episode of activity at local facilities. The intervention component in which participants received a financial incentive achieved a retention rate of 86%. Given that the incentive in this current study was probably more attractive, as it can be exchanged for goods, a retention level of at least 86% was deemed realistic.

According to Sport England statistics, only 14.9% of the sample would meet recommended physical activity levels (Active People Survey, 2006). Therefore 85.1% of the sample would not meet those recommendations. Calculations were made comparing the proportions in the two groups changing from inactive to active.

Assuming that 85.1% of participants would be inactive at baseline and there was an 86% response rate. This equates to a sample of n=1463 in each group from the original 2000.

It was assumed that the more intensive intervention (group A) would be the more effective and therefore a one-tailed test was applied. A minimum level of statistical power of 0.8 was required with an alpha level of 0.05

The following figures demonstrate that the required level of power could be achieved by small differences in proportions between the two groups. Cohen (1988) considers an effect size (h) of 0.2 to be small; these calculations were based on h = 0.1. If the percentage of participants in group B who changed to the recommended level of physical activity were 0.5% then the required level of power would be achieved if the equivalent percentage in group A were 1.45%. The same level of power would be achieved if the figure changing in the two groups was 1.5% and 2.96% or 2.5% and 4.3%.

Following the change in intervention design to a one group, pre-, post-intervention design, sample size and power calculations were reconsidered using the same information presented above. Assuming a sample size of n = 2926 (i.e., n = 1463 (as calculated above) multiplied by 2 to produce one group), level of statistical power of 0.8 and an alpha level of 0.05, the smallest proportion of change that would produce a confidence interval that didn't contain zero was calculated[3] to be 0.0013. Therefore, the required level of power could be achieved if a difference in proportions pre-, and post-intervention greater than this figure were found.

[3] Calculated using standard error and confidence interval equations in Clark-Carter (Clark-Carter, 2010) (pg. 465-467).

4.3 Results

This section reports results of an outcome evaluation of the WTB intervention, detailing; participant flow, WTB sample baseline characteristics: baseline health status; three-, and six-month change in health status; reasons for participation; participant attrition; pedometer output and allocation of financial incentives.

4.3.1 Participant Flow

As Figure 9 demonstrates, 3006 participants registered with the WTB project (Figure 9; T0). At baseline, 117 participants were excluded and 1211 chose not to continue (Figure 9; T1), such that 1678 participants received the intervention; a 55.82% uptake (defined as the percentage of registered individuals who attended their baseline health assessment). Due to the limited participant information collected via the WTB registration card (name, address, postcode and contact telephone number) it was not possible to compare the characteristics of those individuals who registered with the project but failed to receive the intervention with those who continued (Appendix 3).

Of the 1678 participants who received their baseline health assessment, 1082 participants went on to complete their second, three-month, health assessment (Figure 9; T2) and 30.69% (n = 479) of participants who met the inclusion criteria were lost to follow-up. Of the 1082 participants who received their second health assessment 136 participants completed their third (optional) health assessment at six-months (Figure 9; T3) and 87.52% (n = 947) were lost to follow-up. Section 4.5 reports attrition rates and characteristics of participants who dropped out of the intervention at each time point.

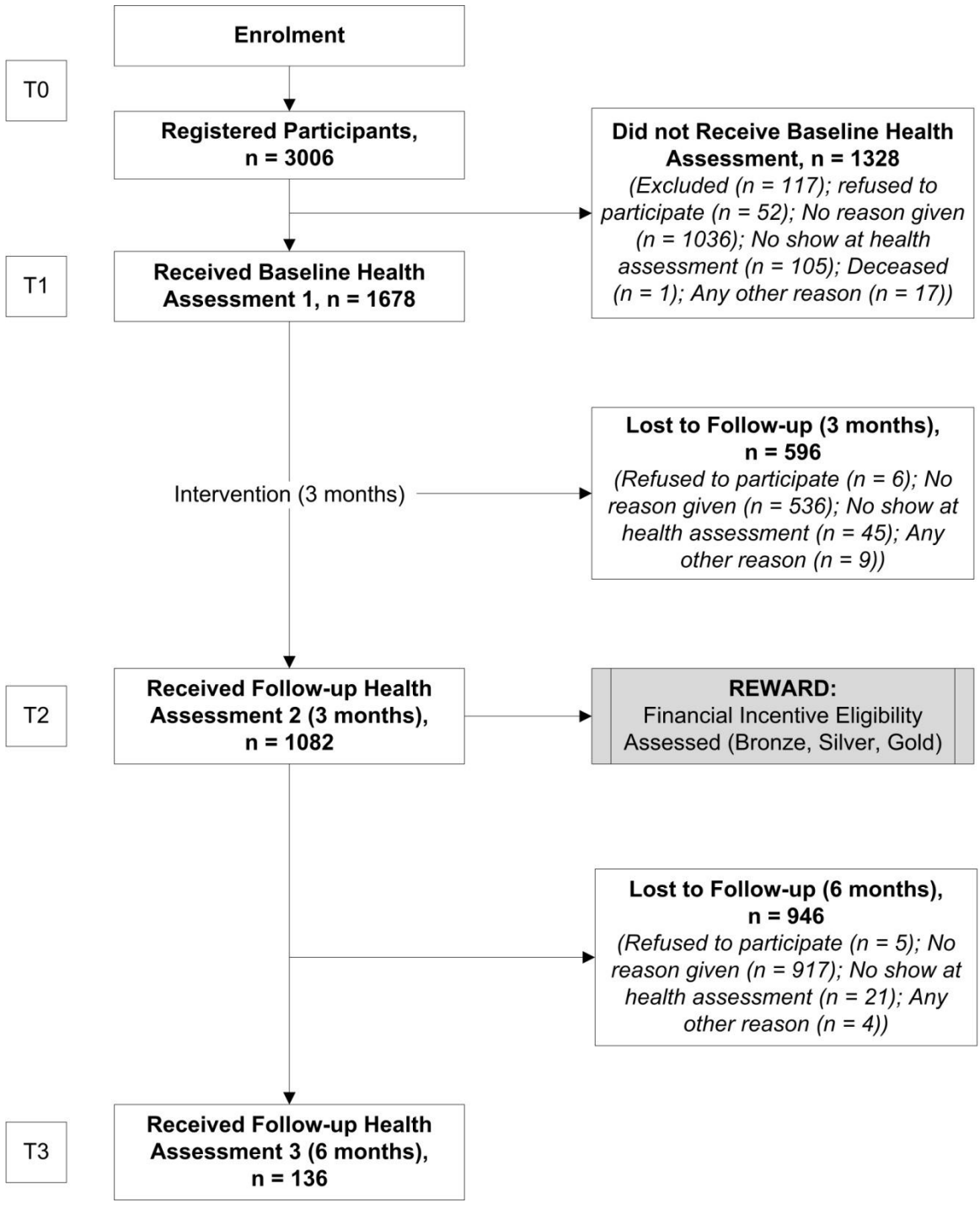

Figure 9. *Participant recruitment and flow*

4.3.2 Recruitment Mapping

4.3.2.1 Geographical Distribution

Table 12 illustrates the geographical recruitment of WTB participants. Participants were recruited from across the Sandwell Borough with higher recruitment in some areas compared to others. The highest number of participants were recruited from West Bromwich (27.8%), followed by Smethwick (20.8%), Wednesday (15.5%) and Oldbury (14.8%). The areas with the lowest recruitment rates were Rowley Regis (12.9%) and Tipton (8.1%). Recruitment in general, provided a good coverage of the Sandwell population (Figure 10).

Table 12. *Participant Recruitment from each area of Sandwell*

Town	**WTB***		**Sandwell Population****	
	N	**%**	**N**	**%**
Olbury	238	14.2	50,641	16.4
Rowley Regis	208	12.4	50,257	16.3
Smethwick	335	20.0	55,166	17.9
Tipton	130	7.7	38,777	12.6
Wednesbury	249	14.8	37,817	12.3
West Bromwich	447	26.6	75,405	24.5
Total	**1607**	**95.8**	**308,063**	**100**
Missing	*71*	*4.2*	-	-

Note. *WTB sample identified from participant postcode location. **2011 Census Key Statistics (Office for National Statistics, 2011b).

4.3.2.2 Deprivation

Figure 10 illustrates the geographical distribution of WTB participants in relation to IMD 2010 scores (Department of Communities and Local Government, 2010). As noted in Section 3.2.4 over 30% of Sandwell's Lower Super Output Areas (LSOA) fall in the most deprived 10% nationally with a further 28% falling in the most deprived 10-20%. However, all deprivation quintiles are represented in Sandwell. WTB participants were recruited from across the Sandwell borough and, therefore, all deprivation quintiles (see Section 3.2.4 for a description).

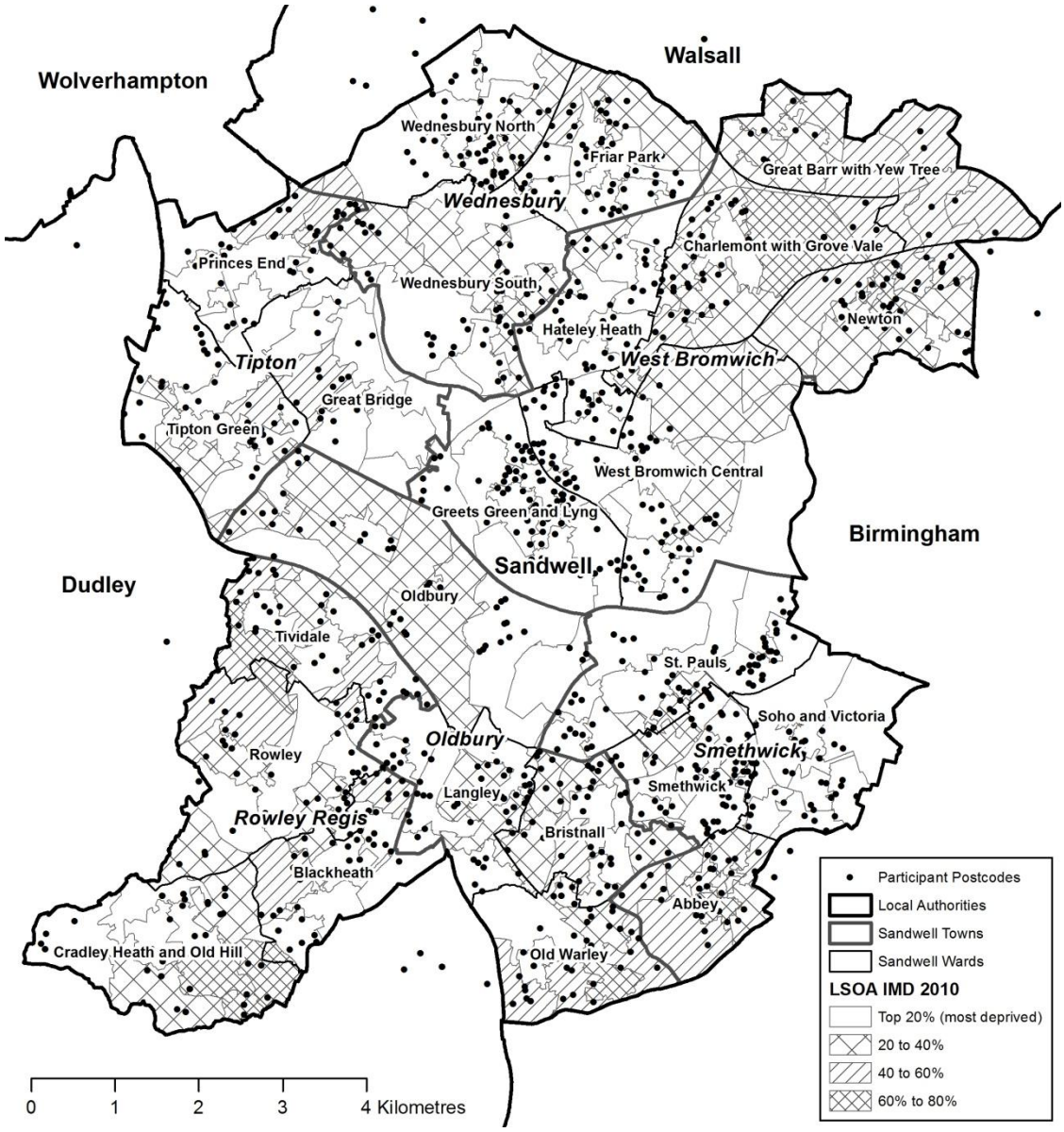

Figure 10. *Geographical distribution of recruited participants (according to participant postcode) by census ward (2011) and Index of Multiple Deprivation (IMD) (2010)*[4]

4.3.3 Baseline Sample Characteristics

The following section reports characteristics of the 1678 participants who registered and went on to participate in the WTB intervention (i.e., attended at least one health

[4] Contains Ordnance Survey data © Crown copyright and database right 2013.

assessment) (Figure 10; T1). Table 13 provides descriptive statistics of participants recruited with comparisons made to the wider Sandwell population.

Table 13. *Summary of baseline sample characteristics of WTB participants*

Demographic Variables	**WTB**		**Sandwell Population***	
	N	**Mean (SD) or %**	**N**	**Mean (SD) or %**
Age (years)	1652	50.47 (16.97)		
Age Group (years)				
16-24	112	6.8	36,975	15.3
25-29	104	6.3	23,085	9.6
30-44	459	27.8	64,814	26.8
45-59	420	25.4	54,884	22.7
60-74	440	26.6	39,750	16.4
75+	117	7.1	22,321	9.2
Gender				
Male	435	26.1	151,592	49.2
Female	1232	73.9	156,471	50.8
Ethnicity				
Arab	-	-	901	0.3
Asian Bangladeshi	111	6.8	6,588	2.1
Asian British	26	1.6	-	-
Asian Indian	128	7.8	31,400	10.2
Asian Pakistani	72	4.4	13,952	4.5
Asian Yemeni	36	2.2	-	-
Asian Other	39	2.4	6,479	2.1
Black African	11	0.7	4,396	1.4
Black British	30	1.8	-	-
Black Caribbean	63	3.8	11,382	3.7
Black Other	9	0.5	2,579	0.7
Chinese	-	-	839	0.3
Mixed	-	-	10,199	3.3
White British	1095	66.8	202,822	65.8
White Irish	13	0.8	2,045	0.8
White Other	5	0.3	10,604	3.5
Other Ethnicity	-	-	3,877	1.3

Occupation Status				
Employed	730	45.7	124,338	62.2
Unemployed	61	3.8	16,049	8.0
Retired	481	30.1	28,582	14.3
Student	70	4.4	17,994	9.0
Looking after home or family	221	13.8	12,859	6.4
Not stated	35	2.2	-	-

Note. *2011 Census Key Statistics (Office for National Statistics, 2011b). SD denotes standard deviation.

4.3.3.1 Age and Gender

The mean age of participants recruited to the WTB intervention was 50.47±16.97 years with a range of 74 years (17 to 91 years). More women than men took part (73.9% vs. 26.1%; Table 13). Greater representation of women is typical of physical activity programmes (Pavey, et al., 2011), but this sample was not comparable with the gender breakdown of the wider Sandwell population (50.8% female, 49.2% male; Table 14).

Table 14. *Descriptive statistics for age and gender of participants at baseline*

			Age (years)				
Gender	**N**	**%**	**Mean**	**Median**	**SD**	**Min**	**Max**
Male	435	26.1	52.73	52.13	17.84	18	91
Female	1232	73.9	49.74	48.61	16.62	17	89

Figure 11 demonstrates that the age of both males and females appear to be normally distributed, with male participants having a slightly higher mean age than females. An independent samples t-test revealed that this difference was statistically significant $t(1643) = 3.13$, $p = .001$; and represented a small effect size $d = .18$.

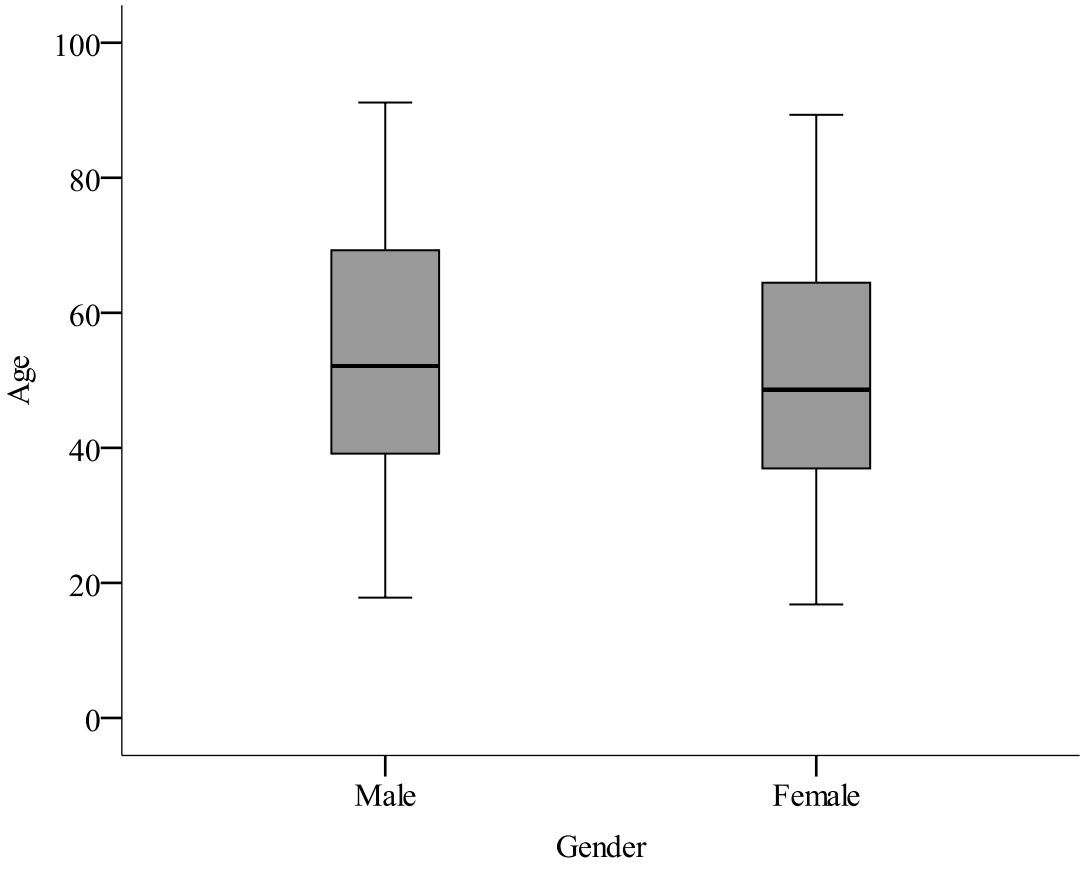

Figure 11. *Boxplots of baseline ages for males and females of participants recruited to the WTB intervention.*

When considering the age breakdown of WTB intervention participants, the majority fall within the 30-44 year (27.8%), 45-49 year (25.4%) and 60-74 year age groups (26.6%) (Table 13). Comparable proportions can be found in the general Sandwell population (aged 16+ years) for some age groups. However, the youngest age group (16-24 years) was the most poorly represented as a proportion of the Sandwell population of that age (WTB; 6.8%, Sandwell; 15.3%). Conversely, a higher proportion of 60-74 year olds participated in the WTB intervention when considering the proportion of this age group in the general Sandwell population (WTB; 26.6%, Sandwell; 16.4%).

4.3.3.2 Ethnicity

The majority of people living in the Sandwell area are White British (65.8%) and this was reflected in the WTB sample (66.8%) (Table 13). The Asian population was well

represented (25.2%) and the number recruited was slightly higher when compared to the Sandwell population (18.9%) (Office for National Statistics, 2011b). Similarly, proportions of Black ethnic groups were comparable in the WTB sample (6.8%) and the wider Sandwell population (5.8%) (Table 13).

4.3.3.3 Occupation Status

The majority of WTB participants were employed (45.7%) or retired (30.1%). Following this, 13.8% of participants 'looked after home or family' (Table 13). A lower proportion of WTB were employed when compared to the general Sandwell population (62.2%). This pattern is reversed when considering the number of retired individuals with twice as many individuals represented when compared to the Sandwell population (Table 13).

4.3.4 Baseline Descriptive Statistics

The section reports descriptive statistics for each dependent variable for 1678 participants who completed their baseline health assessment (Table 15).

Table 15. *A summary table of dependent variable measures at baseline*

Dependent Variables	**Baseline Measures**			
	N	**%**	**Mean**	**SD**
Stage of Change (TTM)				
Precontemplation	56	3.4	-	-
Contemplation	166	10.1	-	-
Preparation	440	26.7	-	-
Action	301	18.3	-	-
Maintenance	686	41.6	-	-
BMI (Kg/m^2)	1675	-	28.69	5.34
BMI Classification				
Underweight	11	0.7	-	-
Healthy Weight	410	24.5	-	-
Overweight	666	39.8	-	-
Obese I	391	23.3	-	-
Obese II	134	8.0	-	-
Obese III	63	3.7	-	-

Waist Hip Ratio				
Male	428	-	0.94	0.08
Female	1204	-	0.86	0.09
Waist Circumference (cm)				
Male	433	-	98.78	12.99
Female	1230	-	93.45	14.57
Blood Pressure (mm Hg)				
Systolic BP	1673	-	134.08	18.63
Diastolic BP	1672	-	79.81	11.41
Blood Pressure Classification				
Optimal	358	21.4	-	-
Normal	299	17.9	-	-
High Normal	331	19.8	-	-
Mild Hypertension (Grade 1)	501	30.0	-	-
Moderate Hypertension (Grade 2)	145	8.7	-	-
Severe Hypertension (Grade 3)	38	2.3	-	-
Theory of Planned Behaviour				
Behavioural Intention	1649	-	2.15	0.95
Perceived Behavioural Control	1637	-	6.08	0.98
Attitude	1564	-	2.22	0.96
Subjective Norm	1645	-	6.33	0.93
EQ-5D Health State (VAS)	1668		69.54	18.20
SF12v2 (Norm Based Scoring)				
Physical Health Component Summary (PCS)	1537	-	48.85	8.96
Mental Health Component Summary (MCS)	1537	-	49.49	9.77

Note. Figures for total N vary by dependent variable due to missing data. SD = Standard Deviation.

4.3.4.1 Dependent Variables: Primary Outcome Measure

Stage of Behaviour Change

At baseline the largest proportion of participants were classified as being in the maintenance stage of the TTM (40.9%, n = 686). This was followed by 26.2% (n = 440) in the preparation stage with the smallest proportion of participants classified in the precontemplation stage (3.3%; n = 56) (Figure 12).

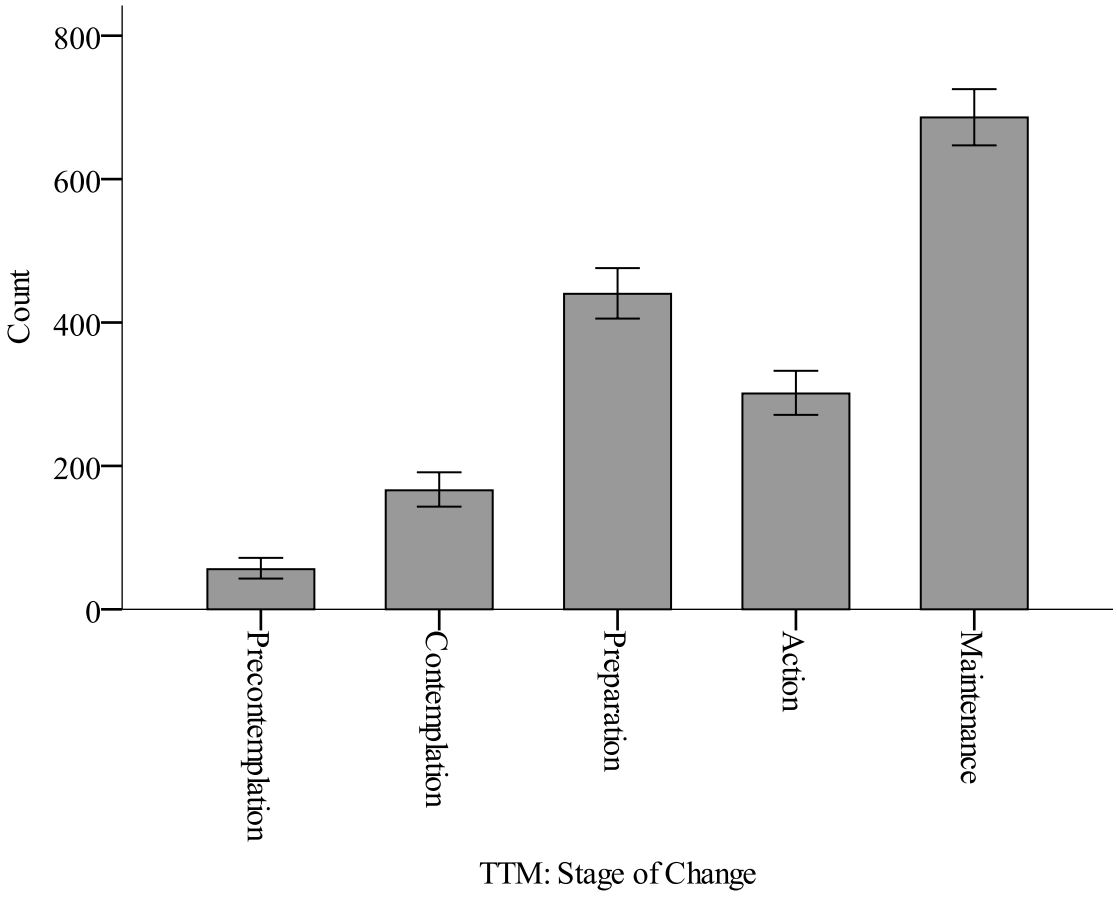

Figure 12. *Baseline classification of stage of change (TTM). Note. Error bars denote 95% confidence intervals*

4.3.4.2 Dependent Variables: Secondary Outcome Measures

BMI

The mean BMI of participants was 28.69±5.34kg/m^2. In relation to BMI classification, 0.7% (n = 11) were classed as underweight and 24.4% (n = 410) as healthy weight. The largest proportion of participants fell within the overweight classification, with 39.7% (n = 666) belonging to this group. When combining the three classifications of obesity, 35.1% (n = 58) of the WTB population belonged to this group (Figure 13).

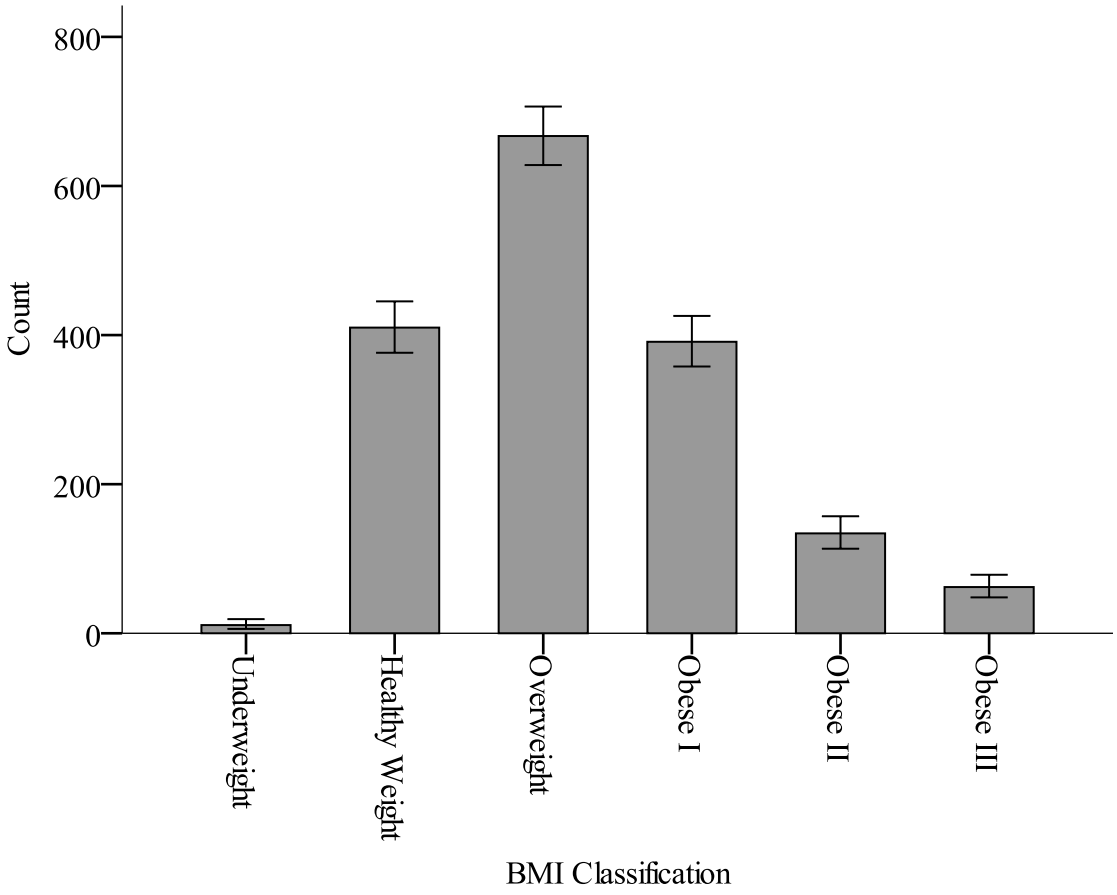

Figure 13. *BMI classification of WTB participants at baseline. Note. Error bars denote 95% confidence intervals*

Figure 14 demonstrates that the proportion of WTB participants who were classified as obese (BMI $\geq$ 30) was higher than the proportion found in the Sandwell population (based on modelled estimates using the Health Survey for England (2006/08) (Department of Health, 2012).

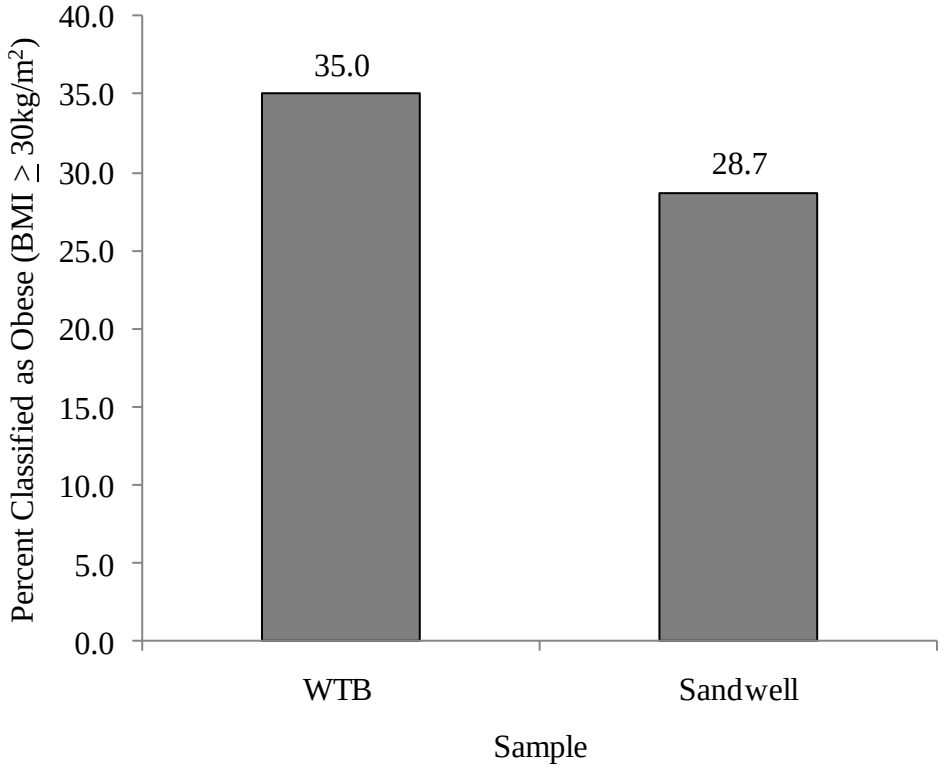

Figure 14. *Percent of obesity (≥ 30 kg/m^2) in the WTB sample and the Sandwell population (modelled estimates using Health Survey for England 2006-2008 (Department of Health, 2012))*

Waist-Hip Ratio (WHR)

Figure 15 illustrates the WHR of participants by gender. The mean WHR at baseline was 0.94±0.08 for males and 0.86±0.09 for females.

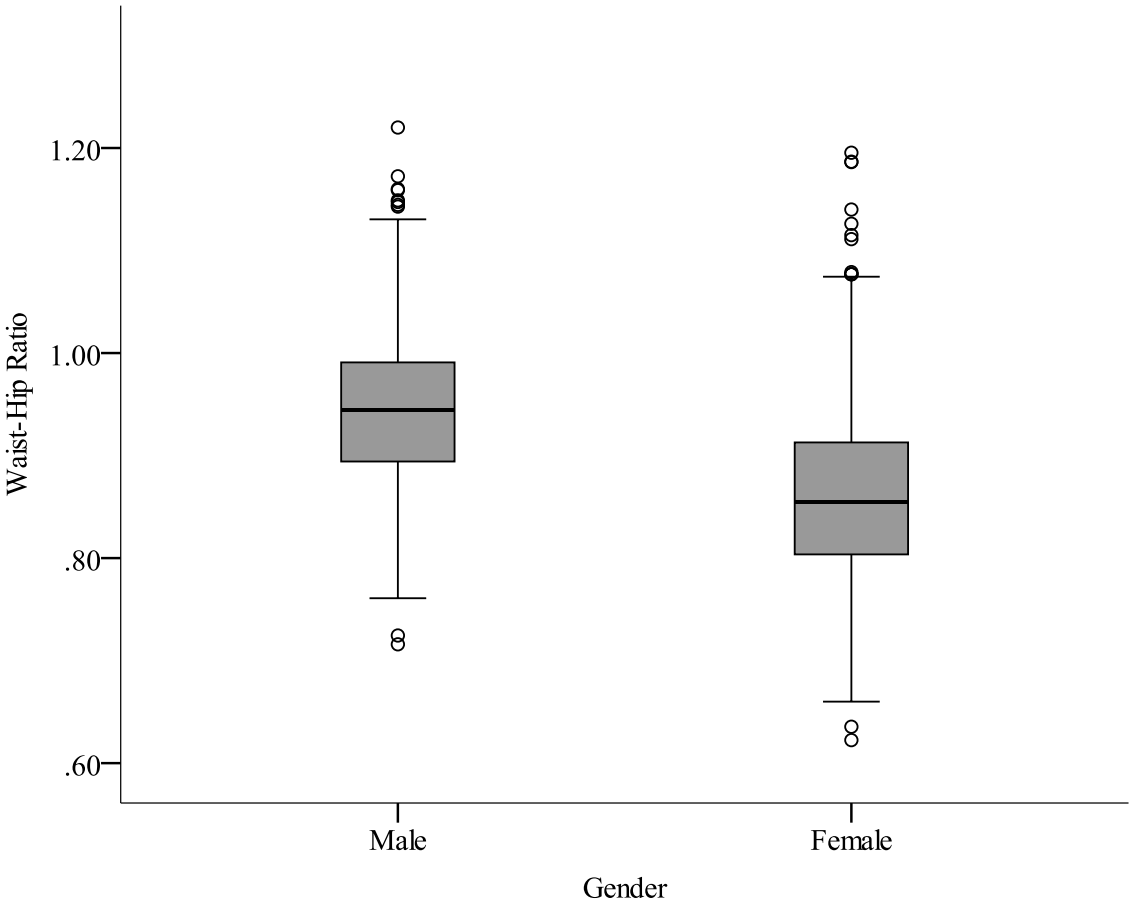

Figure 15. *Boxplots of baseline waist-hip ratio of WTB participants by gender*

As previously mentioned, WHR's > 0.85 in women and > 1.0 in men (WHO, 2000) are an indicator of a substantially increased risk of metabolic complications. In this sample, 51.1% (n = 640) of females recorded a WHR of above 0.85, and 23.4% (n = 102) of males recorded a WHR of above 1.0.

Waist Circumference

At baseline, mean waist circumference was 98.80±13.06 cm for males and 93.45±14.57 cm for females. Figure 16 illustrates the distribution of waist circumference of WTB participants recruited by gender.

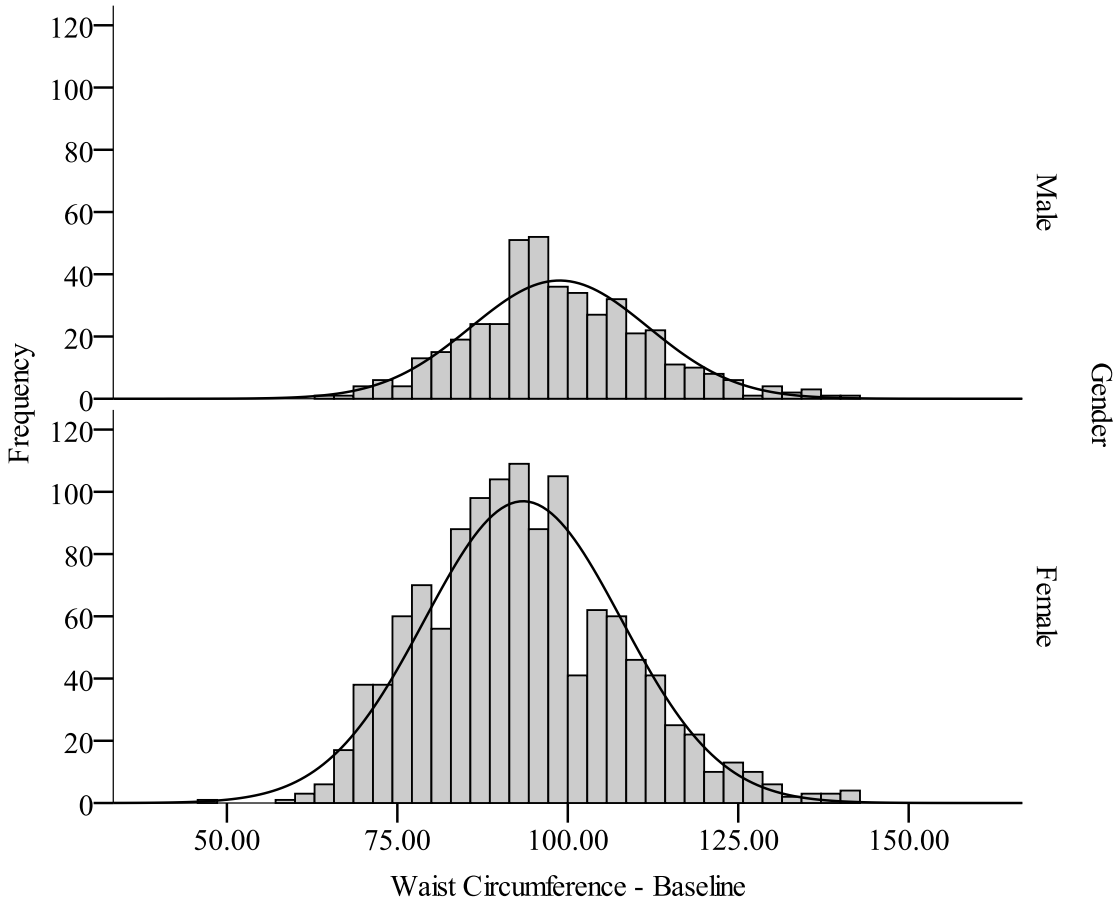

Figure 16. *Histograms showing the waist circumference (cm) of recruited participants by gender*

The World Health Organisation defines sex-specific waist circumference values that signify increased health risk (≥80 cm for women, ≥94 cm for men) and substantially increased health risk (≥88 cm for women, ≥102 cm for men) (WHO, 2000).The mean waist circumference measurement for both males and females in this sample signified an increased risk to health. Moreover, 81.5% (n = 1021) of females and 64.9% (n = 283) of males recorded a waist circumference which signified an increased health risk; and 62.9% (n = 788) of female and 38.8% (n = 169) of male participants recorded a waist circumference which indicated a *substantially* increased risk to health.

Blood Pressure

At baseline, mean systolic and diastolic blood pressure was 134.08±18.63 mm Hg and 79.81±11.41 mm Hg, respectively.

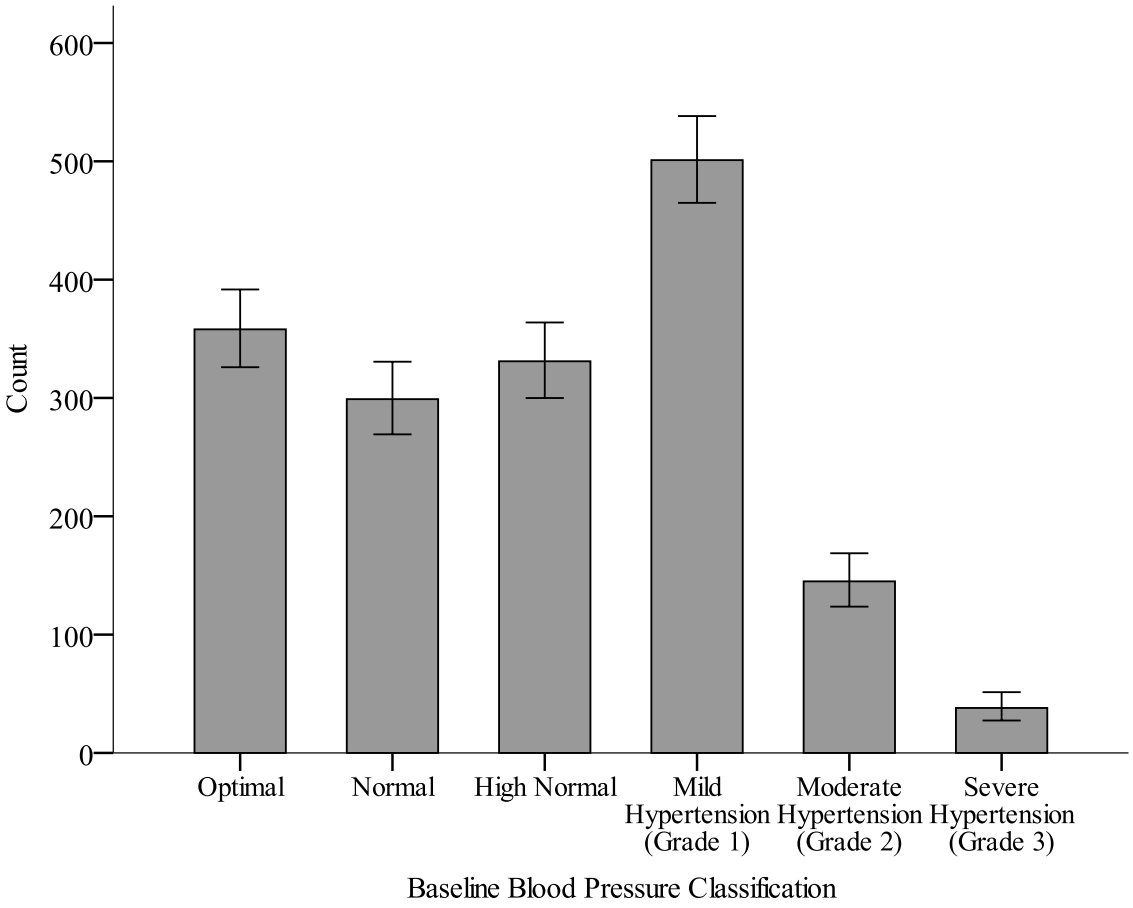

Figure 17. *Blood pressure classification of participants at baseline. Note. Error bars denote 95% confidence intervals*[5]

In relation to the blood pressure classifications (Williams, et al., 2004) 58.8% (n = 988) of participants were categorised as having an optimal, normal or high normal blood pressure measurements. In comparison, 40.8% (n = 684) were classified as suffering from hypertension, ranging from mild to severe (Figure 17).

Theory of Planned Behaviour

Means and standard deviations for each TPB construct are presented in Table 15. Participants scored a mean of 2.15±0.95 on the behavioural intention subscale, which demonstrates that WTB participants intended to participate in moderate physical activity in the future (-3 to +3). A mean perceived behavioural control score of 6.08±0.98 highlighted that participants felt capable and confident in participating in moderate

[5] *Note.* Participants with blood pressure measurements >160/100mmHg were advised to visit their GP immediately and only allowed to continue after GP approval.

physical activity (+1 to +7). The mean attitude subscale scored 2.22±0.96 which indicated a positive attitude toward future participation in moderate physical activity (-3 to +3). The subjective norm subscale relates to the perceived social pressure to perform or not perform a particular behaviour, in this sample participants scored a mean of 6.33±0.93. Participants, therefore, perceived that their significant others were supportive of their participation in physical activity (+1 to +7).

EQ-5D (VAS): Perceived Health Status

The EQ-5D (VAS) health thermometer requires participants to rate, on a scale of 0-100, how they feel at a specific time point. A value of 0 equals the worst possible health state and 100 the best possible health state.

The mean health state score, according to the EQ-5D health thermometer, for participants in the WTB sample was 69.54±18.20. Figure 18 presents a boxplot representing self-reported health status as measured by the EQ-5D.

These values were expected due to the exclusion criteria employed in recruitment. It is likely that participants who perceived themselves as having a poor health state were excluded from the study due to medical contraindications (n = 77 were excluded for health reasons).

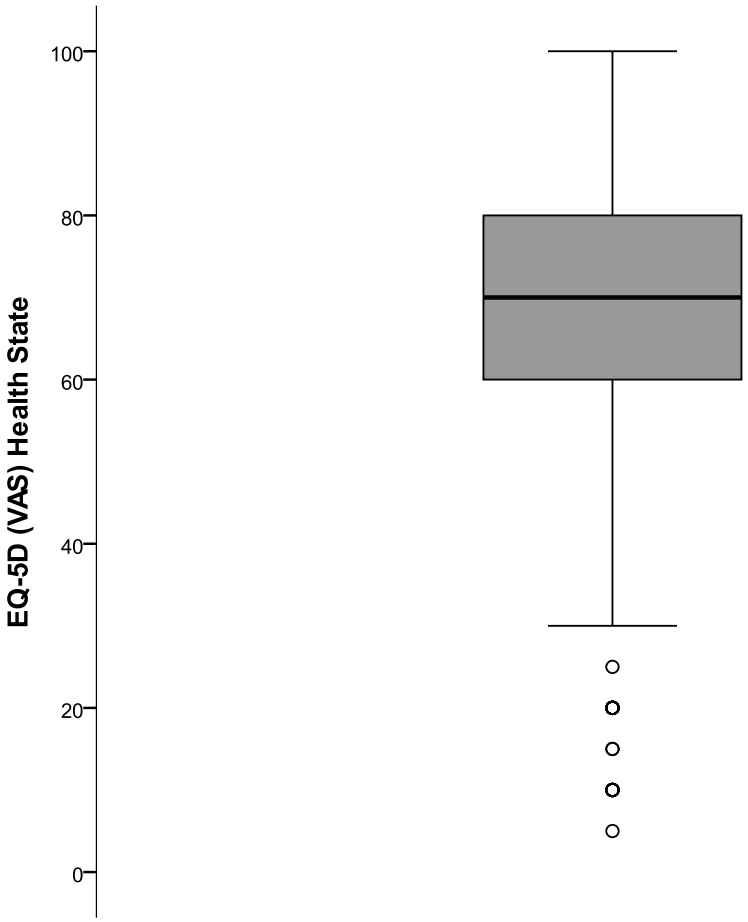

Figure 18. *Boxplot of self-reported health status as measured by the EQ-5D visual analogue scale*

SF-12v2 Health Status

Participants in this sample rated their general health (over the past four weeks) as excellent (5.7%, n = 90), very good (24.7%, n = 392), good (43.9%, n = 696), fair (22.8%, n = 361) or poor (2.8%, n = 45) (Figure 19).

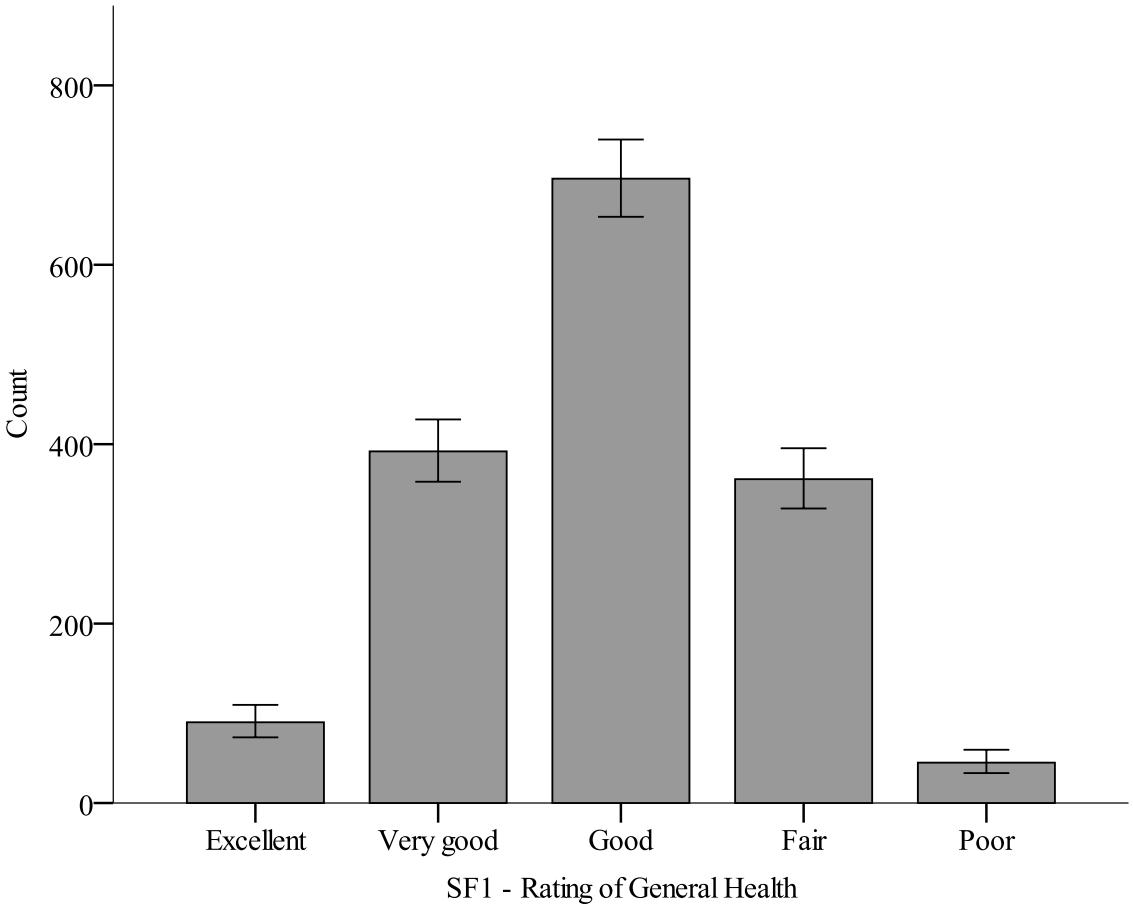

Figure 19. *Self-reported general health measured by the SF1 question of the SF12v2. Note. Error bars denote 95% confidence intervals*

According to UK Norms participants in this sample are above average health status in all sub-scales of the SF12v2 (physical functioning; role physical; bodily pain; general health; vitality; social functioning; role emotional; and mental health). Participants scored higher on the mental component summary (MCS) score (Mean 49.49±9.77) compared to the physical component summary score (PCS) (Mean 48.85± 8.96).

4.3.4.3 Baseline: Summary

To summarise, at baseline, the majority of participants were classed as being in the maintenance and preparation stages of the TTM. The largest proportion of participants were classified as being overweight and mean waist circumference measurements signified an increased risk to health according to the WHO (2000) in both males and females. This was also the case for the WHR for female participants. Additionally, over

40% of participants were classed as suffering from hypertension. However, self-reported health status demonstrated that the majority of participants rated their health as good (SF1) with participants scoring higher on the SF12v2 summary scores compared to population norms.

4.3.5 Data Analysis

This section presents the statistical methods employed and the data screening and assumption testing procedures undertaken. Following this, the results of data analysis for each dependent variable under investigation are presented. Primary comparisons were made between baseline and three-months; pre- and post-intervention period (two levels of the independent variable). Secondary comparisons for each dependent variable are then presented, including data from the third (six-month) health assessment. This section reports comparisons for each level of the independent variable (i.e. time; baseline, three-, and six-months).

4.3.5.1 Statistical Methods

The effectiveness of the prescribed programme was analysed in terms of changes in the outcome measures from baseline to three-months (primary comparisons) and baseline to six-months (secondary comparisons).

Primary Comparisons (Pre-, Post Intervention; Baseline to Three-months)

Primary comparisons were made between baseline and three-months, pre- and post-intervention (Section 4.3.5.3). Stage of change, as measured by the TTM was the primary outcome measure. Secondary outcome measures included; objective measures of health status (height, weight, BMI, blood pressure, WHR and waist circumference), self-reported health status (EQ-5D, SF12v2) and TPB.

Within-subjects t-tests were used to compare means of outcome measures which met the requirements of parametric analyses from baseline to three-months (two-levels of the independent variable; time). For those variables which did not meet the assumptions for a parametric test the non-parametric equivalent Wicoxon Signed Rank Test for Matched-Pairs was used to compare change from baseline to three-months.

Secondary Comparisons (Baseline to Six-months)

Subsequently, primary and secondary outcome measures were compared between baseline, three- and six-months (three levels of the independent variable). These primary and secondary outcome measures were used to compare within-group difference between baseline three-, and six-month follow-up (three-levels of the independent variable) (Section 4.3.5.7). This analysis investigates change over time, including the third, optional, health assessment at six-months. For variables which met the assumptions for a parametric test a one-way within-subject ANOVA was used. Standard t-tests for within-subject designs were used to follow-up any significant finding applying a Tukey HSD correction. For each statistically significant variable three post-hoc comparisons were made; (a) baseline to three-month follow-up, (b) baseline to six-month follow-up and (c) three-, to six-month follow-up. A Friedman two-way ANOVA was used for variables which did not meet the assumptions of a parametric statistical test. Wicoxon Signed Rank Test for Matched-Pairs with Bonferroni-Dunn correction was used to follow-up statistically significant findings. Again, for each statistically significant variable three post-hoc comparisons were made; (a) baseline to three-month follow-up, (b) baseline to six-month follow-up and (c) three-, to six-month follow-up. All data analysis was completed using SPSS, Version 20.

4.3.5.2 Data Screening and Assumption Testing

Prior to conducting inferential statistics, underlying assumption testing for parametric tests was carried out. Data was firstly screened for accuracy using descriptive statistics. Normality was assessed, where appropriate, for each dependent variable (and each level of the independent variable) using histograms and boxplots. Visual inspection of histograms and boxplots demonstrated the presence of potential outliers which may have contributed to a number of variables being moderately skewed (Appendix 10). The data were re-checked to ensure no errors had been made in entering participant scores for each variable. To further determine whether univariate outliers were present, standardised z-scores were produced, identifying extreme (>3.29 standard deviations (SD) away from the mean), probable (>2.58 SDs away from the mean) and potential (>1.96 SD away from the mean) outliers (Field, 2009) (Appendix 10). Values that were identified as extreme were considered univariate outliers. To assess their impact, data analyses were conducted with and without the inclusion of such outliers and results

compared. The presence of outliers were deemed to affect the outcome of a parametric test when a change in statistical significance and/or a marked change in effect size were found. No effect was found for any parametric variable which indicated that the results were robust against the presence of potential outliers. Therefore, results are presented from data analysis with all values included.

4.3.5.3 Primary Comparisons: Baseline and Three-months (pre-post Intervention)

This section reports comparisons between baseline and three-month follow-up data for those participants who completed their second health assessment (n =1082). Information relating to participant attrition at baseline and three-months is presented in Section 4.5.

4.3.5.4 Dependent Variables: Primary Outcome Measure

Stage of Behaviour Change

Participants were given a rank score depending on their self-reported stage of change. Change in stage of change classification from baseline to three-month follow-up was measured using a Wilcoxon Signed Rank Test for Matched-Pairs. Stage of change was higher at three-month follow-up (Median = 5.0) compared to baseline (Median = 4.0) and this change was statistically significant (T = 101540, $z = 9.66$, $p < .001$, *one-tailed test*, $d = .63$, N = 525). This constitutes a medium to large effect size[6].

As Section 4.3.1 described, 1678 participants received a baseline health assessment, with 1082 receiving a three-month health assessment. In order to account for this attrition on the effect size found for change in participant stage of change, the effect size was recalculated for the equivalent of an intention to treat analysis by treating N = 1678 (i.e., the equivalent of including people who hadn't changed from baseline to three-month follow-up). This re-calculation produced a medium effect size of $d = .47$.

[6] Size of effect indicated by Cohen's *d;* small, $d = 0.2$; medium, $d = 0.5$; large, $d = 0.8$ (Cohen, 1988).

Table 16. *Number of participants in each stage of change (TTM) pre- and post-intervention (baseline and three-months)*

Stage of Change (TTM)	Time			
	Baseline		3-Months	
	N	%	N	%
Precontemplation	31	2.9	36	3.3
Contemplation	94	8.8	62	5.8
Preparation	268	25.1	70	6.5
Action	189	17.7	305	28.3
Maintenance	486	45.5	605	56.1

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment.

Table 16 and Figure 20 show the number and proportion of WTB participants in each stage of the TTM pre- and post-intervention. A greater proportion of individuals reported being in the maintenance stage at three-months (56.1%) compared to baseline (45.5%). Similarly, at three-months, the action stage contained a greater proportion of participants (28.3%) compared to baseline (17.7%). This was mirrored by a decrease in the proportion of participants in the preparation stage of the TTM at three-months (6.5%) compared to baseline (25.1%).

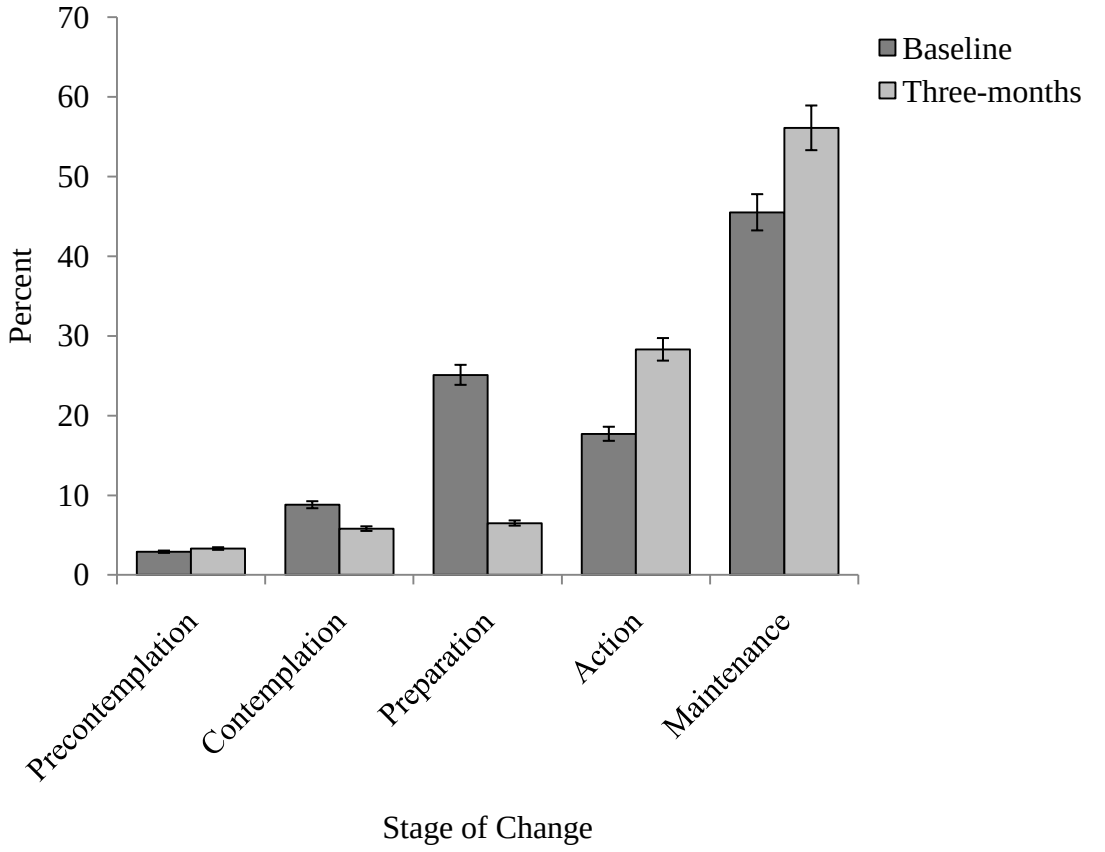

Figure 20. *The proportion of participants in each stage of change at baseline and three-months. Error bars denote 95% confidence intervals*

4.3.5.5 Dependent Variables: Secondary Outcome Measures

BMI

Change in BMI from baseline to three-month follow-up was measured using a one-tailed, paired-samples t-test. Mean BMI score decreased from baseline (28.55kg/m^2, Standard Error (SE) = 0.15) to three-month follow-up (28.36kg/m^2, SE = 0.15). This decrease was statistically significant (t (1080) = 4.39, p < .001, CI 95% = .097 to .254)[7], and represented a small effect size, d = .03.

[7] 95% confidence interval of the difference score.

Table 17. *The BMI Classification, according to WHO (2013), of participants pre- and post-intervention*

BMI Classification	Time			
	Baseline		3-Months	
	N	%	N	%
Underweight	2	0.2	4	0.4
Healthy Weight	268	24.8	282	26.1
Overweight	446	41.3	438	40.5
Obese I	251	23.3	242	22.4
Obese II	80	7.4	84	7.8
Obese II	34	3.1	31	2.9

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment.

Table 17 shows that there was a slight increase in the proportion of individuals classified as 'healthy weight' at three-months (26.1%) compared to baseline (24.8%). Similarly, there was a mirrored decrease in those classified as 'obese I' at three-months (22.4%) compared to baseline (23.3%). The change in the proportion of participants in each classification of BMI from baseline (Mdn = 2.0) to three-month follow-up (Mdn = 2.0) as assessed by a Wilcoxon Signed Rank test was statistically significant (T = 6935.5, z = -1.87, p = .031, *one-tailed test, d* = .12, N = 181). This constituted a small effect size.

Waist-Hip Ratio

Change in WHR, from baseline to three-month follow-up, was measured using a one-tailed, paired-samples t-test. Table 18 shows the means, standard deviations and standard errors of participant WHR pre- and post-intervention. The mean WHR for male participants decreased from baseline to three-month follow-up. This decrease was statistically significant (t (281) = 2.93, p < .001, *one-tailed test*, CI 95% = .003 to .015) and represented a small effect size, d = .18.

In relation to female participants, Table 18 shows that the mean WHR fell from baseline to three-month follow-up and this difference was statistically significant (t (790) = 6.45,

$p < .001$, *one-tailed test*, CI 95% = .009 to .017) and represented a small effect size, $d = .16$.

Table 18. *Mean WHR of participants at baseline and three-months*

Waist-Hip Ratio		Time					
		Baseline			3-Months		
		Mean	SD	SE	Mean	SD	SE
	Male	0.95	0.08	0.005	0.94	0.08	0.005
	Female	0.86	0.09	0.003	0.85	0.08	0.003

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. SD = Standard Deviation, SE = Standard Error.

Figure 21 shows the frequency of participants who recorded a WHR that signified a substantially increased health risk pre- and post-intervention by to gender. Reductions from baseline to three months were observed in both males (25.0 to 21.5%) and females (53 to 47.4%).

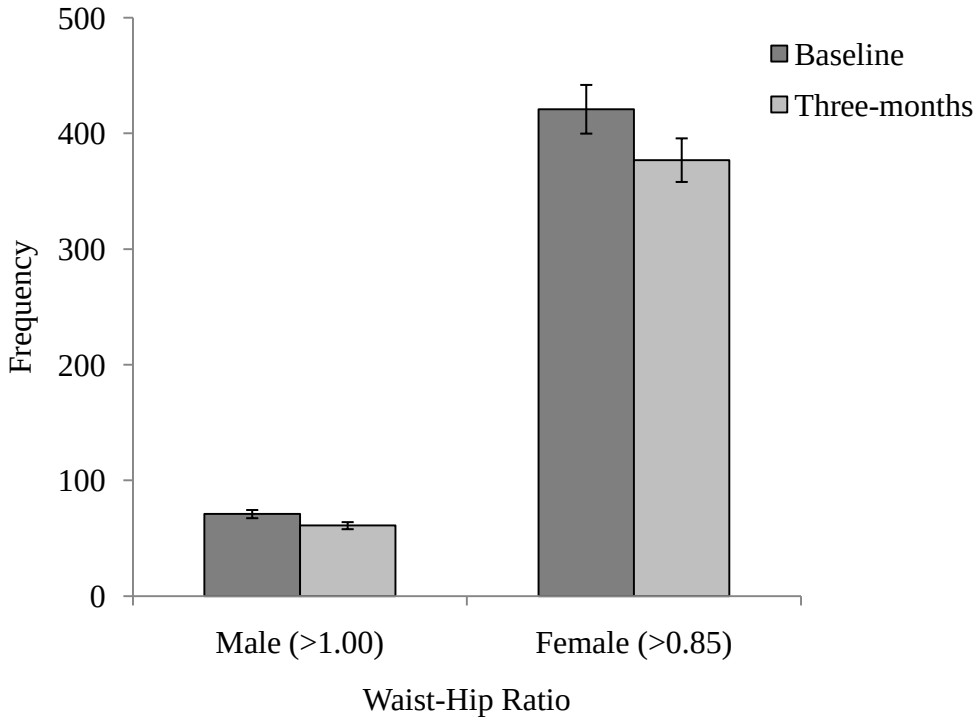

Figure 21. *Frequency of participants, at baseline and three-month follow-up, with a WHR signifying a substantially increased risk to health, according to gender (WHO, 2000, 2008). Note. Error bars denote 95% confidence intervals*

Waist Circumference

The mean waist circumference (cm) of participants decreased from baseline to three-month follow-up for both male and female participants, this change was measured using a paired-samples t-test (Table 19). For Males, the mean waist circumference fell from 98.89±11.80cm at baseline to 97.37±11.70cm at three-month follow-up. This decrease was statistically significant (t (282) = 4.77, p < .001, *one-tailed test,* CI 95% = 0.891 to 2.142) and represented a small effect size, d = .13.

The waist circumference of female participants fell from 92.92±13.86cm at baseline to 90.71±13.75cm at three-month follow-up (Table 19). This decrease was statistically significant (t (793) = 10.01, p < .001, *one-tailed test,* CI 95% = 1.775 to 2.642) and represented a small effect size, d = .16.

Table 19. *Mean waist circumference of participants pre- and post intervention (baseline and three-months)*

Waist Circumference (cm)	**Time**					
	Baseline			**3-Months**		
	Mean	**SD**	**SE**	**Mean**	**SD**	**SE**
Male	98.89	11.80	0.70	97.37	11.70	0.70
Female	92.92	13.86	0.49	90.71	13.75	0.49

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. SD = Standard Deviation, SE = Standard Error.

Figure 22 shows the frequency of participants who recorded a waist circumference that signified a substantially increased health risk pre- and post-intervention by gender. At baseline, 39.4% of males had a waist circumference of more than 102cm, this figure decreased to 34.9% at three-months. For female participants, 63% recorded a waist circumference of greater than 88cm, which decreased to 55% at three-months.

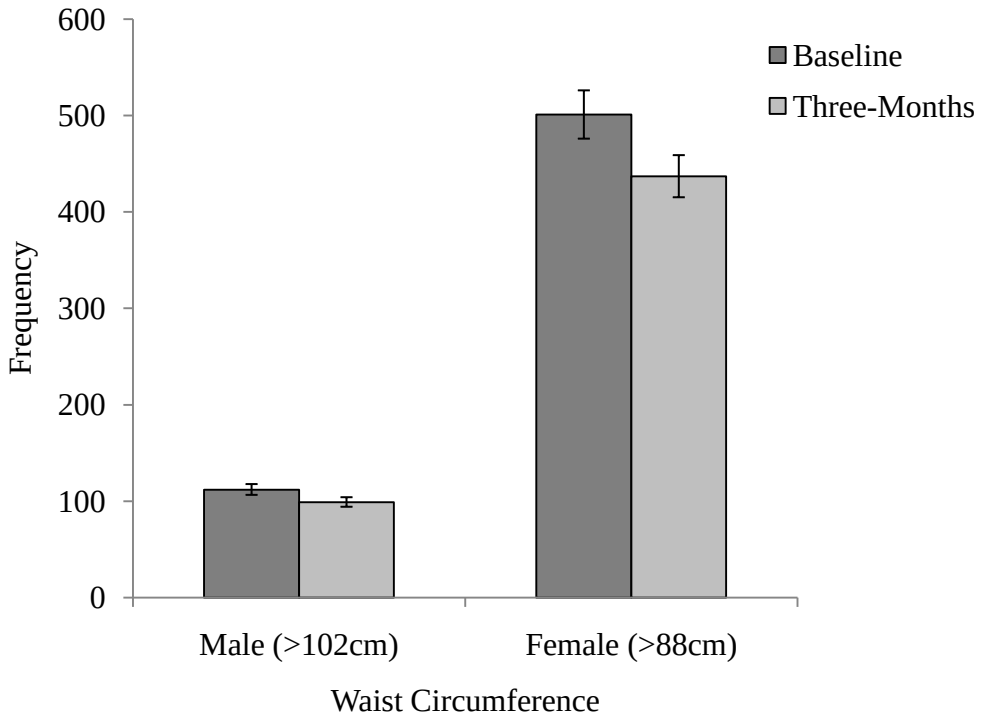

Figure 22. *Frequency of participants, at baseline and three-month follow-up, with a waist circumference signifying a substantially increased risk to health, by gender (Han, et al., 1995; WHO, 2000, 2008). Note. Error bars denote 95% confidence intervals*

Blood Pressure

At three-month follow-up, a decrease was achieved in both systolic and diastolic blood pressure (Table 20). The mean systolic blood pressure at baseline decreased from 135.07±18.63mm Hg to 134.19±18.14mm Hg at three-months. A paired-samples t-test demonstrated that this change was statistically significant (t (1080) = 1.88, p = .030, *one-tailed test,* CI 95% = -.038 to 1.788) and this represented a small effect size d = .05.

The mean diastolic blood pressure fell from 79.57±11.00mm Hg at baseline to 78.70±11.45mm Hg at three-month follow-up. This change was measured using a one-tailed, paired-samples t-test which showed that this decrease was statistically significant (t (1079) = 2.74, p = .003, *one-tailed test,* CI 95% = .248 to 1.498) and represented a small effect size, d = .08.

Table 20. *Mean systolic and diastolic blood pressure measurements pre- and post-intervention*

Blood Pressure (mm Hg)	Time					
	Baseline			3-Months		
	Mean	SD	SE	Mean	SD	SE
Systolic	135.07	18.63	0.567	134.19	18.14	0.552
Diastolic	79.57	11.00	0.335	78.70	11.45	0.348

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. SD = Standard Deviation, SE = Standard Error.

When comparing blood pressure classification pre- and post-intervention, Table 21 shows that the number of individuals with an optimal blood pressure increased slightly from 19.8% at baseline to 20.3% at three-months. In addition, the number of individuals classified as suffering from severe hypertension decreased by 1% (n=11) from baseline to three-month follow-up. However, these changes were not statistically significant as measured by the Wilcoxon signed rank test for matched-pairs (T = 89216.50, z = -1.02, *one-tailed test*, p = .154, d = .06, N = 611).

Table 21. *Blood pressure classification for participants pre- and post-intervention*

BP Classification*	Time			
	Baseline		3-Months	
	N	%	N	%
Optimal	214	19.8	219	20.3
Normal	198	18.3	195	18.0
High Normal	203	18.8	222	20.5
Mild Hypertension (Grade I)	343	31.8	330	30.5
Moderate Hypertension (Grade II)	100	9.3	104	9.6
Severe Hypertension (Grade III)	22	2.0	11	1.0

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. *Williams et al., (2004), NICE Guidance 127 (2011).

Theory of Planned Behaviour

In relation to the TPB questionnaire, statistically significant changes were achieved in the positive direction for the behavioural intention, perceived behavioural control and attitude subscales (see Section 4.2.5 for subscale scoring) (Table 22). Change in subscale scores from baseline to three-month follow-up, were measured using a one-tailed, paired-samples t-test.

Table 22. *Means, standard deviations and standard errors for the TPB subscales*

	Time					
Theory of Planned	**Baseline**			**3-Months**		
Behaviour	**Mean**	**SD**	**SE**	**Mean**	**SD**	**SE**
Behavioural Intention	2.14	0.93	0.029	2.26	0.97	0.030
Perceived Behavioural Control	6.07	0.98	0.030	6.16	1.04	0.032
Attitude	2.22	0.94	0.029	2.30	0.89	0.027
Subjective Norm	6.33	0.89	0.027	6.33	1.01	0.031

Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. SD = Standard Deviation, SE = Standard Error.

The mean behavioural intention subscale score increased from 2.14±0.93 at baseline to 2.26±0.97 at three-month follow-up and this change was statistically significant (t (1065) = -3.92, p < .001, *one-tailed test,* CI 95% = -.183 to -.061) and represented a small effect size, d = .13.

Similarly, the mean perceived behavioural control subscale score increased from 6.07±0.98 at baseline to 6.16±1.04 at three-month follow-up and this change was statistically significant (t (1054) = -3.15, p = .001, *one-tailed test,* CI 95% = -.158 to -.037) and represented a small effect size, d = .10.

Scores on the attitude subscale also increased from 2.22±0.94 at baseline to 2.30±0.89 at three-month follow-up and this change was statistically significant (t (1021) = -1.09, p = .011, *one-tailed test,* CI 95% = -.125 to .002) and represented an effect size of d = .06.

However, the subjective norm subscale score did not change significantly from baseline (Mean 6.33±0.89) to three-month follow-up (Mean 6.33±1.01) (t (1061) = -.089, p = .465, *one-tailed test*, d = .003, CI 95% = -.125 to .002).

EQ-5D (VAS): Perceived Health Status

The perceived health status, as measured by the EQ-5D, (0=worst possible health, 100=best possible health) increased from baseline to three-month follow-up from 70.64 (SE = 0.537) to 79.92 (SE = 0.463). Using a one-tailed, paired-samples t-test, this increase was statistically significant (t (1079) = -17.58, p < .001, CI 95% = -10.32 to -8.24) and represented a medium effect size, d = .56.

Short-Form 12v2 (SF-12v2)

Figure 23 illustrates the change in proportions of participants rating their health (over the past four-weeks) as excellent, very good, good, fair or poor from baseline to three-month follow-up. At follow-up, 10.1% (n = 107) of participants rated there health as excellent compared to 6.9% (n = 71) at baseline. Conversely a lower proportion of participants rated their health as fair or poor at follow-up (14.8%, n = 157) compared to baseline (23.0% n = 238). The highest proportion of participants rated their health as good or very good at baseline (70%, n = 723) and follow-up (75.2%, n = 799).

A one-tailed, Wilcoxon Signed Rank test for matched-pairs test was used to compare changes in the proportions of participant's health ratings at baseline and three-months. This test showed a statistically significant change in a positive direction (excellent = 1; poor = 5) (T = 27201, z = -8.10, p < .001, d = .51, N = 432). This constituted a medium effect size.

As Section 4.3.1 described, 1678 participants received a baseline health assessment, with 1082 receiving a three-month health assessment. In order to account for this attrition on participants health rating, the effect size was recalculated for the equivalent of an intention to treat analysis by treating N = 1678 (i.e., the equivalent of including people who hadn't changed from baseline to three-month follow-up). This re-calculation produced a medium effect size of d = .41.

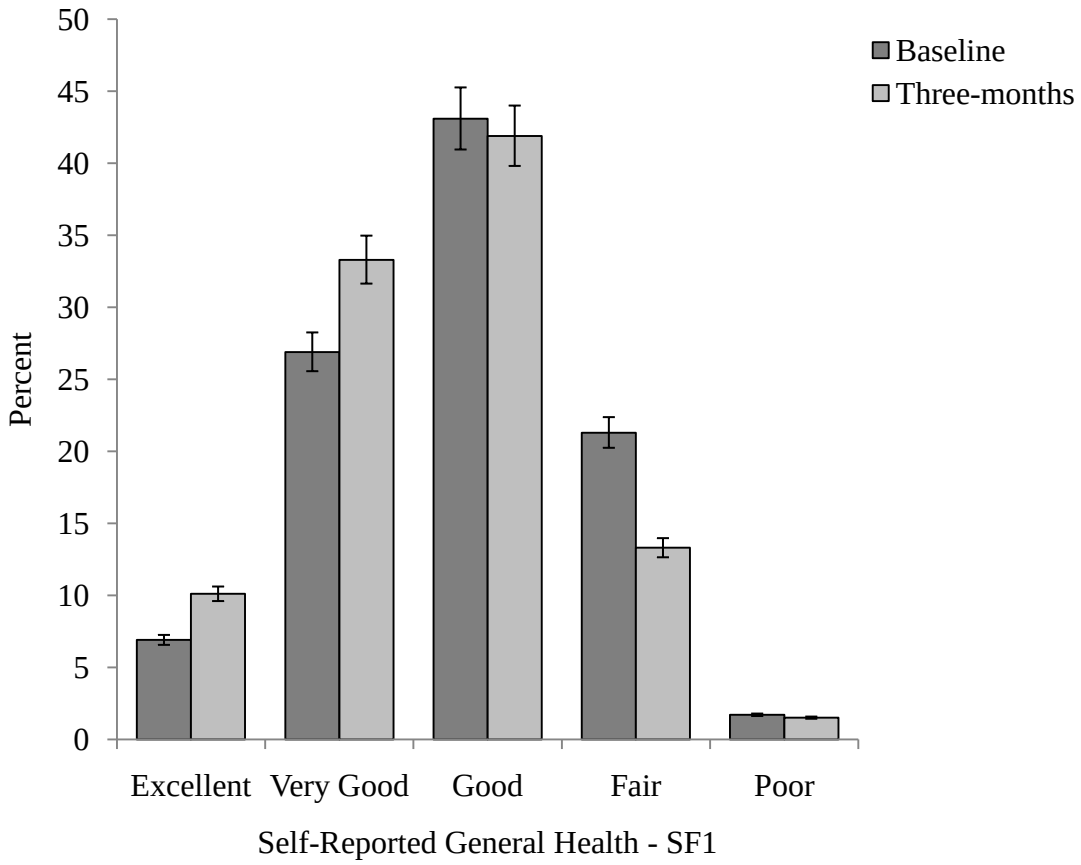

Figure 23. *Self-reported general health measured by the SF1 question of the SF12v2 at baseline and three-months. Error bars denote 95% confidence intervals*

In relation to the SF12v2 summary scores, mean PCS and MCS increased from baseline to three-month follow-up (Table 23 and Figure 24).

Table 23. *SF12v2 physical and mental component scores pre- and post-intervention*

SF12v2	Time					
	Baseline			3-Months		
	Mean	**SD**	**SE**	**Mean**	**SD**	**SE**
Physical Component Score	48.81	9.03	0.285	49.80	8.58	0.271
Mental Component Score	50.09	9.60	0.303	52.64	8.43	0.266

Note. Note. Data only shown for n =1082 who completed their baseline and three-month health assessment. This analysis includes n = 1002 with complete data allowing for summary component scores to be calculated. SD = Standard Deviation, SE = Standard Error.

Changes in PCS and MCS summary scores were assessed using a one-tailed, paired-samples t-test and showed statistical significance. Mean PCS score increased significantly from 48.81 (SE = 0.285) at baseline to 49.80 (SE = 8.58) at three-months (t (1001) = -4.35, p < .001, CI 95% = -1.429 to -.552) and represented a small effect size, d = .11. Mean MCS score also significantly increased from 50.09 (SE = 0.303) at baseline to 52.64 (SE = 0.266) at three-months (t (1001) = -9.63, p < .001, CI 95% = -3.062 to -2.026) and represented a small-medium effect size, d = .28. Figure 24 shows change from baseline from three-month follow-up in SF12v2 summary scores.

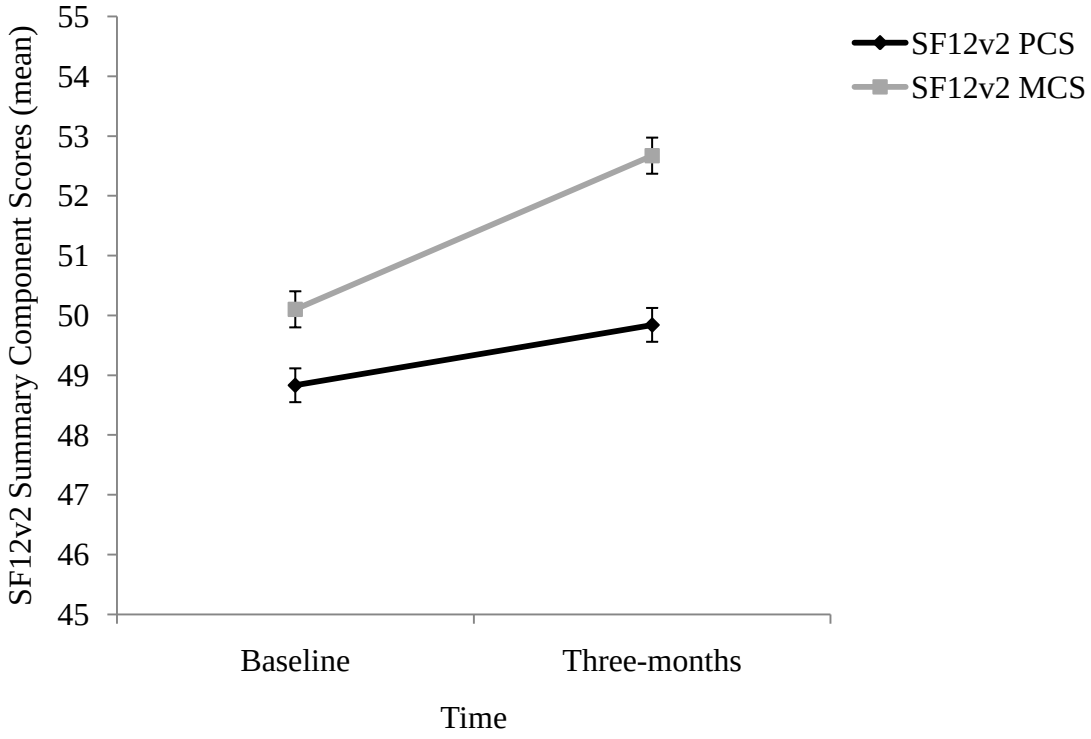

Figure 24. *Mean SF12v2 summary component scores pre- and post-intervention. Note. Error bars denote standard error of the mean*

Mean PCS scores within this sample moved closer to the UK norm score of 50 from baseline to three-months. In relation to the MCS, mean scores were slightly above the UK norm at baseline and this improved post-intervention.

4.3.5.6 Summary: Primary Comparisons (Baseline and Three-months)

The WTB programme was successful in achieving statistically significant (α-level = 0.05) positive changes in objective and subjective measures of health status at three-month follow-up compared to baseline. There were significant positive changes in the primary outcome measure: TTM stage of change. Significant decreases were also observed in BMI, WHR, and waist-circumference (male and female), and systolic and diastolic blood pressure. In addition there were positive changes in perceived health status, as measured by the EQ-5D and SF12v2 (General health (SF1), physical and mental health component summary scores) and in the behavioural intention, perceived behavioural control and attitude subscales of the TPB. Significant changes were not observed for blood pressure classification and the subjective norm subscale of the TPB.

4.3.5.7 Secondary Comparisons: Baseline, Three- and Six-months

This section reports comparisons of each dependent variable from baseline to six-months (i.e., participants who completed three health assessments, n = 136). Information relating to participant attrition at three- and six-months is presented in Section 4.5.

4.3.5.8 Dependent Variables: Primary Outcome Measure

Stage of Behaviour Change

Table 24 shows the proportion of participants in each stage of change at baseline, three- and six-months. The majority of participants at each time frame where classified as being in the maintenance stage of the TTM (baseline, 59.3%; three-months, 72.6%; six-months, 77.8%).

Table 24. *Number of participants in each stage of change (TTM) at baseline, three- and six-months*

Stage of Change (TTM)	Time					
	Baseline		3-Months		6-Months	
	N	%	N	%	N	%
Precontemplation	7	5.2	4	3.0	4	3.0
Contemplation	0	0	4	3.0	5	3.7
Preparation	25	18.5	2	1.5	8	5.9
Action	23	17.0	27	20.0	13	9.6
Maintenance	80	59.3	98	72.6	105	77.8

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

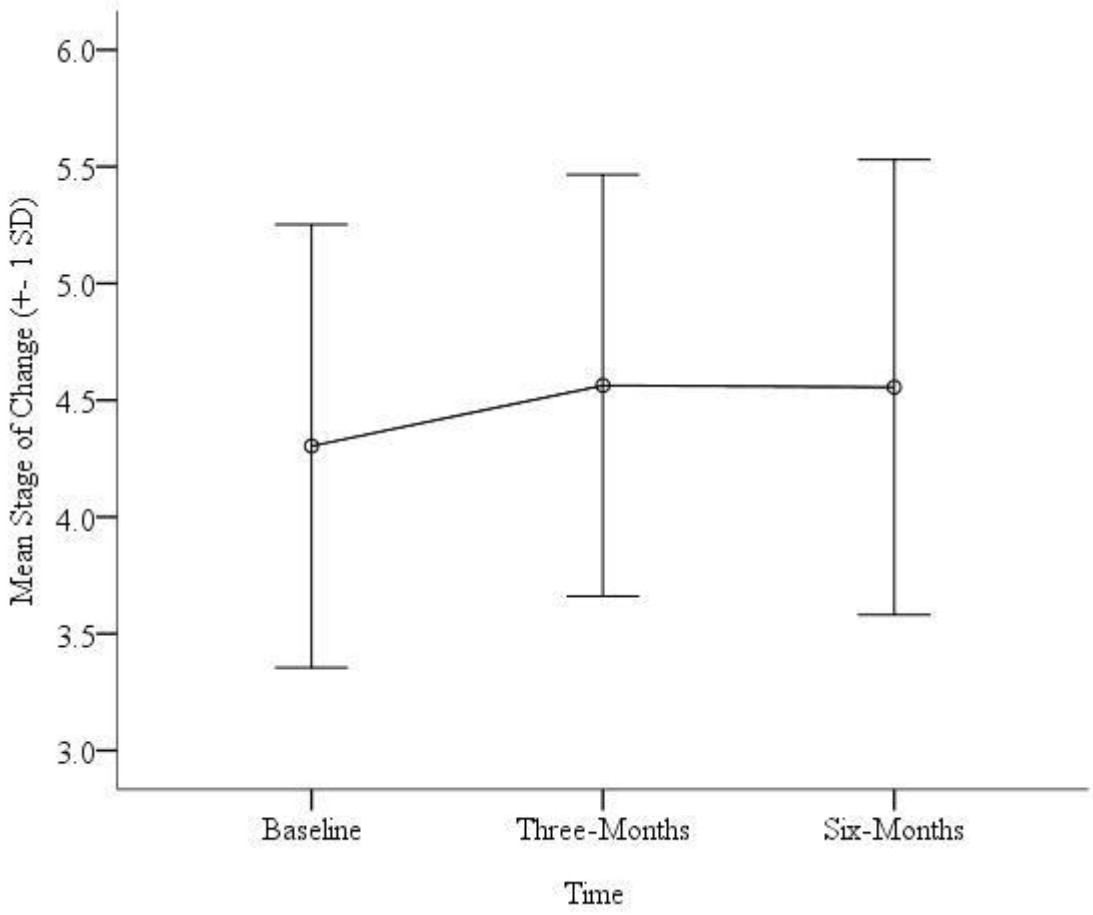

Figure 25. *Mean and standard deviations (SD) of stage of change (TTM) at baseline, three- and six-months*

A Friedman's two-way ANOVA was used to evaluate differences in medians of stage of change, as measured by the TTM, at six-month follow-up compared to baseline. A statistically significant positive change was found (χ^2_F = 13.67, df = 2, p < .001, N = 135) and represented a medium to large effect size, d = .64 (Figure 25).

Follow-up pairwise comparisons were conducted using a Wilcoxon Signed Rank test for matched pairs. Adjusted p-values using a Bonferroni-Dunn test[8] were applied to control for Type I errors across these comparisons. The first comparison identified that stage of change at three-month follow-up (Mean Rank = 2.07) was significantly higher than stage of change at baseline (Mean Rank = 1.83) (T = 1098, z = 2.82, p = .003, d = .50, N = 55). This constituted a medium effect size.

Secondly, there was also a statistically significant change from baseline (Mean Rank = 1.83) to six-month follow-up (Mean Rank = 2.10) with regards to stage of change (T = 1177.5, z = 2.55, p = .011, d = .43, N = 58). This constituted a medium effect size.

Thirdly, there was no statistically significant change in stage of change from three-month to six-month follow-up (T = 450.5, z = -.013, p = .990, d = .02, N =42).

4.3.5.9 Dependent Variables: Secondary Outcome Measures

BMI

Mean BMI scores decreased from baseline to six-month follow-up (Table 25) and a one-way, within-subjects ANOVA (one-tailed) was used to assess this change. No statistically significant difference was found[9] ($F_{(1.64, 219.7)}$ = .273, p = .359, d = .09).

[8] A Bonferroni-Dunn correction was applied, and all effects are reported at a .017 alpha level of significance as three post-hoc comparisons were made (α-level / number of contrasts).

[9] Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2)$ = 33.02, p < .001, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = .82).

Table 25. *Mean BMI scores for participants at baseline, three- and six months*

	BMI (kg/m²)			
	Mean	**Standard Deviation**	**Standard Error**	**Variance**
Baseline	28.16	5.26	0.453	27.69
Three Months	28.11	5.54	0.477	30.66
Six Months	28.08	5.42	0.466	29.36

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

Figure 26 shows the proportion of participants in each classification of BMI at baseline, three-, and six-months. There was no statistically significant change in BMI classification from baseline to six-month follow-up as assessed by a Friedman's two-way ANOVA (χ^2_F = 1.15, df = 2, *one-tailed*, p = .30, d = .18, N = 135).

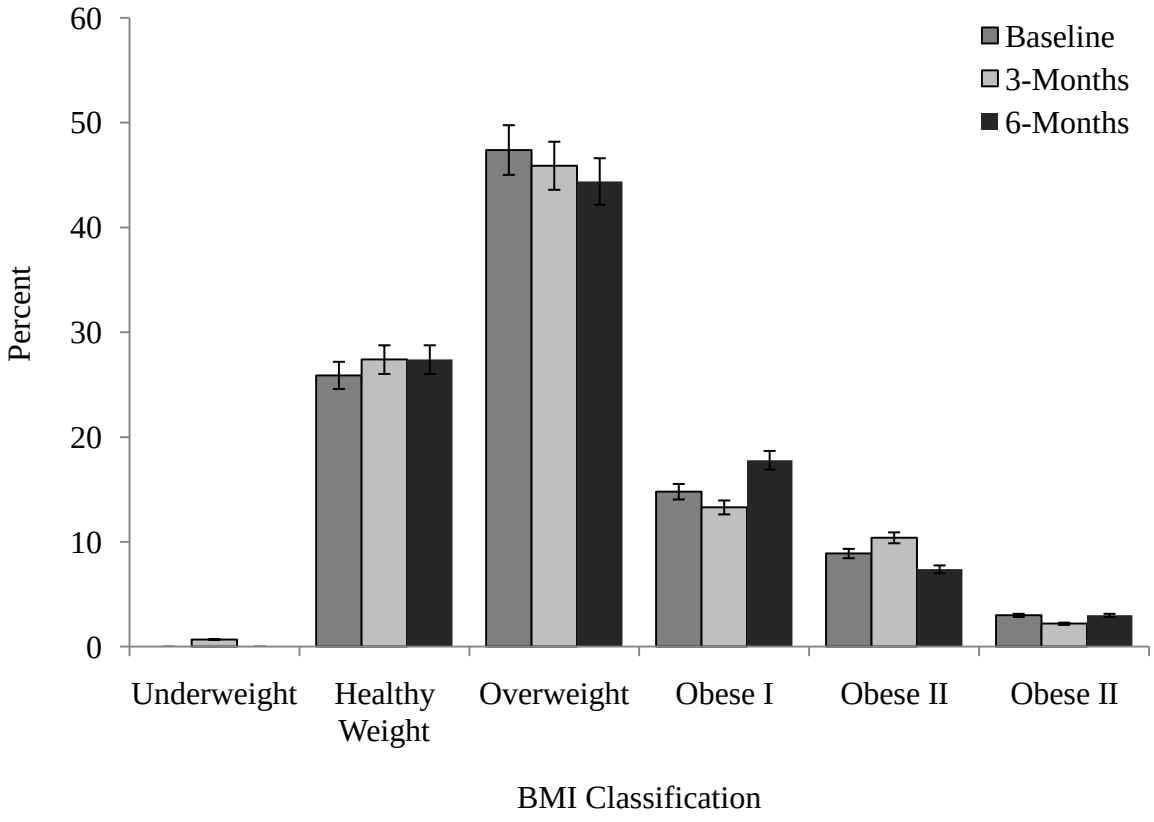

Figure 26. *The BMI Classification, according to WHO (2013), of participants at baseline, three- and six-months. Note. Error bars denote 95% confidence intervals*

Waist-Hip Ratio

The mean WHR of both male and female participants decreased from baseline to three-months (Table 26). This was maintained at six-months for female participants. However, for males, this figure returned to baseline levels.

Table 26. *WHR for participants at baseline, three- and six months*

	Waist-Hip Ratio			
Gender	**Mean**	**Standard Deviation**	**Standard Error**	**Variance**
Male				
Baseline	0.96	0.07	0.012	0.005
Three Months	0.95	0.10	0.016	0.009
Six Months	0.96	0.08	0.013	0.006
Female				
Baseline	0.88	0.09	0.009	0.008
Three Months	0.86	0.08	0.008	0.006
Six Months	0.88	0.09	0.009	0.007

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

A one-way, within-subjects ANOVA (one-tailed test) was used to assess change in WHR from baseline to six-month follow-up in males and females. No statistically significant difference was found for male participants ($F_{(2, 70)} = .822$, $p = .222$, $d = .29$).

For female participants, there was a statistically significant decrease in WHR from baseline to six-month follow-up, $F_{(2, 196)} = 4.06$, $p = .009$, $d = .41$. Post-hoc analyses using paired, *one-tailed*, *t*-tests and applying Tukey's HSD indicated that mean three-month WHR significantly decreased from baseline (t (98) = 2.75, $p = .004$, CI 95% = 0.005 to 0.030), and represented a small effect size, $d = .20$. There was also a change in the negative direction in mean WHR scores at three- and six-months, however, this was not significant when applying Tukey's HSD[10] (t (98) = -1.99 $p = .025$, CI 95% = -.024 to -.001) and represented a small effect size, $d = .09$. In addition, mean WHR scores at baseline and six-months did not significantly differ (t (98) = .895 $p = .187$, $d = .07$, CI 95% = -.007 to .019).

[10] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010). T-test statistic was not equal to or greater than critical *t* for Tukey's HSD.

Waist Circumference

The mean waist circumference of both males and females decreased from baseline to three-months, but, this was not maintained at six-months with measures increasing towards (although not reaching) baseline levels (Table 27).

Table 27. *Waist circumference for participants at baseline, three- and six months*

	Waist Circumference (cm)			
Gender	**Mean**	**Standard Deviation**	**Standard Error**	**Variance**
Male				
Baseline	98.39	10.02	1.67	100.47
Three Months	96.42	12.99	2.17	168.76
Six Months	98.03	10.56	1.76	111.57
Female				
Baseline	94.85	15.13	1.52	228.78
Three Months	92.83	14.54	1.46	211.39
Six Months	93.04	14.38	1.45	206.81

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

A one-way, within-subjects ANOVA (one-tailed test) was used to assess change in waist circumference from baseline to six-month follow-up. There was a statistically significant difference in waist circumference for male participants from baseline to six-month follow-up[11], $F_{(1.678, 58.728)} = 2.748$, $p = .035$, $d = .56$. However, post-hoc analyses using *one-tailed*, paired *t*-tests and applying Tukey's HSD[12] indicated that a) mean three-month waist circumference did not significantly decrease from baseline (t (35) = 1.89, $p = .034$, $d = .17$, CI 95% = -0.148 to 4.09), b) mean waist circumference scores at baseline and six-months did not significantly differ (t (35) = 0.519. $p = .30$, $d = .04$, CI 95% = -1.05 to 1.77) and c) mean six-month waist circumference did not significantly increase from three-month follow-up (t (35) = -1.77, $p = .043$, CI 95% = -3.46 to 0.24), which represented a small effect size, $d = -.14$.

[11] Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2) = 7.246$, $p = .027$, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .84$).
[12] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010). T-test statistic was not equal to or greater than critical *t* for Tukey's HSD.

For female participants, there was a statistically significant change in waist circumference from baseline to six-month follow-up, $F_{(2, 196)} = 6.502$, $p = .002$, $d = .51$. Post-hoc analyses using *one-tailed,* paired *t*-tests and applying Tukey's HSD[13] indicated that a) mean three-month waist circumference significantly decreased from baseline (t (98) = 2.94, $p = .002$, CI 95% = 0.65 to 3.39), and represented a small effect size, $d = .14$, and b) mean six-month waist circumference significantly decreased from baseline (t (98) = 3.10, $p = .001$, CI 95% = 0.66 to 2.98), and represented a small effect size, $d = .12$. However, mean waist circumference scores at three- and six-months did not significantly differ (t (98) = -.339 $p = .368$, $d = .01$, CI 95% = -1.39 to .981).

Blood Pressure

Table 28 shows values for systolic and diastolic blood pressure at baseline, three-, and six-months. Both mean systolic and diastolic blood pressure decreased between baseline and three-months and this decrease was not maintained at six-months.

Table 28. *Mean systolic and diastolic blood pressure measurements at baseline, three- and six-months*

	Blood Pressure (mm Hg)			
	Mean	**Standard Deviation**	**Standard Error**	**Variance**
Systolic				
Baseline	135.74	17.55	1.51	307.91
Three-Months	132.98	16.91	1.46	286.08
Six-Months	134.04	17.96	1.55	322.49
Diastolic				
Baseline	78.27	9.77	0.841	95.51
Three-Months	76.80	9.83	0.846	96.61
Six-Months	76.85	9.74	0.838	94.88

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

[13] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010).

A one-way, within-subjects ANOVA (one-tailed) was used to assess change in systolic and diastolic blood pressure from baseline to six-month follow-up. There was no significant change in diastolic blood pressure measurements from baseline to six-month follow-up ($F_{(2, 268)} = 2.250$, $p = .054$, $d = .26$).

In comparison, a statistically significant positive change in systolic blood pressure was found ($F_{(2, 268)} = 2.388$, $p = .047$, $d = .27$). However, post-hoc analyses using a *one-tailed*, paired *t*-test and applying Tukey's HSD indicated that mean systolic blood pressure did not significantly change from[14] a) baseline to three-month follow-up (t (134) = 2.14, $p = .018$, $d = .16$, CI 95% = 0.20 to 5.32), b) baseline and six-months (t (134) = 1.25, $p = .106$, CI 95% = -0.98 to 4.37, $d = .10$) and c) three- and six-months (t (134) = -.909, $p = .183$, $d = -.06$, CI 95% = -3.39 to 1.25).

There was also no statistically significant change in blood pressure classification from baseline to six-month follow-up as assessed by a Friedman's two-way ANOVA (χ^2_F = 0.12, df = 2, $p = .941$, $d = .06$, N = 131).

Theory of Planned Behaviour

In relation to the Theory of Planned Behaviour questionnaire, mean scores for each subscale increased from baseline to six-months with the exception of a decrease in the behavioural intention subscale from three-, to six-months (Table 29). Changes in subscale scores were evaluated using a one-way, within-subjects ANOVA (one-tailed).

Table 29. *Mean subscale scores for the TPB at baseline, three-, and six-months*

	Mean	Standard Deviation	Standard Error	Variance
Behavioural Intention				
Baseline	2.08	0.82	0.070	0.664
Three-Months	2.26	0.90	0.077	0.809
Six-Months	2.26	0.90	0.077	0.805
Perceived Behavioural Control				
Baseline	6.03	0.82	0.071	0.668
Three-Months	6.11	1.00	0.086	1.008
Six-Months	6.11	0.95	0.082	0.906

[14] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010). T-test statistic was not equal to or greater than critical *t* for Tukey's HSD.

Attitude					
	Baseline	2.08	0.91	0.080	0.827
	Three-Months	2.29	0.90	0.078	0.810
	Six-Months	2.31	0.78	0.067	0.610
Subjective Norm					
	Baseline	6.25	0.81	0.070	0.651
	Three-Months	6.28	0.95	0.082	0.910
	Six-Months	6.39	0.83	0.071	0.690

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

In relation to the behavioural intention subscale, a one-way, within-subjects ANOVA (one-tailed) found a statistically significant change from baseline to six-month follow-up ($F_{(2, 266)}$ = 3.586, p = .015, d =.33). Post-hoc analyses using a *one-tailed,* paired *t*-test and applying Tukey's HSD indicated that mean behavioural intention score improved from baseline to three-month follow-up (t (133) = -2.40, p = .009, CI 95% = -.368 to -.035), and represented a small effect size, d = .24. However, when applying Tukey's HSD, no statistically significant difference was found between a) baseline and six-month behavioural intention scores (t (133) = -2.12, p = .002, d = .21, CI 95% = -.347 to -.012) [15] and b) three- and six-month behavioural intention scores (t (134) = 0.46, p = .481, d = .004, CI 95% = -.155 to .162).

A one-way, within-subjects ANOVA (one-tailed) also found a statistically significant change from baseline to six-month follow-up in attitude scores ($F_{(2, 256)}$ = 7.558, p < .001, d =.49). Post-hoc analyses using a *one-tailed*, paired *t*-test and applying Tukey's HSD indicated that mean attitude score improved from a) baseline to three-month follow-up (t (128) = -3.184, p = .001, CI 95% = -.415 to -.097), and represented a small to medium effect size, d = .29, and b) baseline to six-month follow-up (t (128) = -3.426, p < .001, CI 95% = -.424 to -.114), and represented a small to medium effect size, d = 32. Conversely, there was no statistically significant change in attitude scores from three- to six-month follow-up (t (133) = -.307, p = .38, d = .04, CI 95% = -.167 to .122).

[15] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010). T-test statistic was not equal to or greater than critical *t* for Tukey's HSD.

In relation to perceived behavioural control, a one-way, within-subjects ANOVA (one-tailed) found no statistically significant change from baseline to six-month follow-up ($F_{(2, 264)}$ = .714, p = .246, d =.14). Similarly, no statistically significant change was found in subjective norm scores from baseline to six-month follow-up ($F_{(2, 266)}$ = 1.877, p = .353, d =.24).

EQ-5D (VAS): Perceived Health Status

The mean rating of perceived health status, as measured by the EQ-5D visual analogue scale (1 = worst possible health state, 100 = best possible health state), increased from baseline to three-months and subsequently decreased from three-, to six-months (Table 30 and Figure 27).

Table 30. *Mean perceived health status at baseline, three-, and six-months, as measured by the EQ-5D visual analogue scale*

	EQ-5D (VAS)			
	Mean	**Standard Deviation**	**Standard Error**	**Variance**
Baseline	74.27	15.88	1.37	252.25
Three-Months	80.94	14.51	1.25	210.43
Six-Months	78.88	15.09	1.30	227.73

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month).

A one-way, within-subjects ANOVA was used to assess change in perceived health status from baseline to six-month follow-up and a statistically significant difference was found [16], ($F_{(1.883, 252.291)}$ = 11.48, p < .001, d = .56). Post-hoc analyses using paired t-tests and applying Tukey's HSD [17] indicated that a) mean three-month EQ-5D score significantly increased from baseline (t (134) = -4.7 3, p < .001, CI 95% = -9.46 to -3.88), and represented a medium sized effect, d = .44, and b) mean six-month EQ-5D score significantly increased from baseline (t (134) = -2.92, p = .002, CI 95% = -7.73 to -1.48), and represented a small to medium sized effect, d = .30. However, mean EQ-5D

[16] Mauchly's test indicated that the assumption of sphericity had been violated, $\chi^2(2) = 8.550$, p = .014, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity (ε = .94).
[17] Calculated using, df error, number of means to be contrasted and critical t-values for Tukey's HSD from Clark-Carter (2010).

health state scores at three- and six-months did not significantly differ (t (134) = 1.62, p = .054, d = .14, CI 95% = -.453 to 4.57).

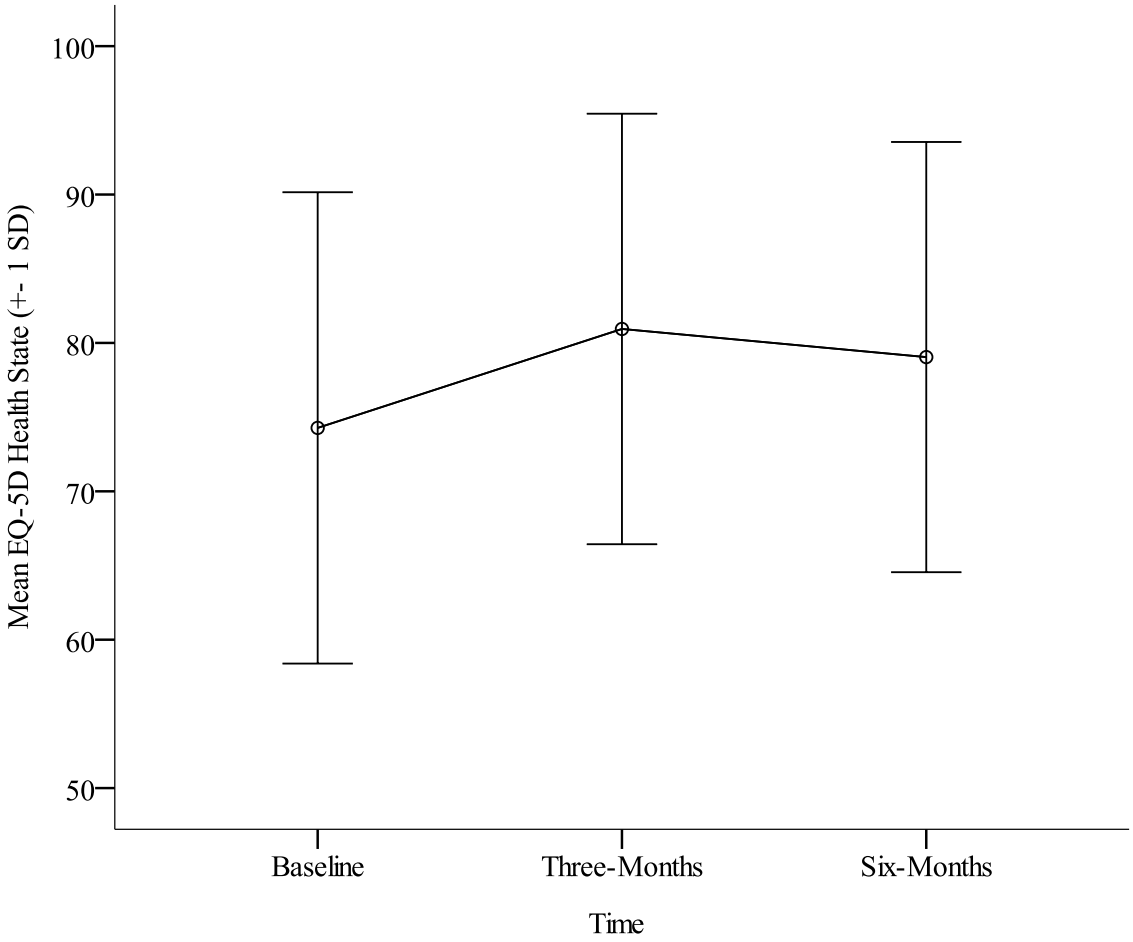

Figure 27. *Means and standard deviations (SD) of EQ-5D health state scores at baseline, three-, and six-months*

Short Form 12v2 (SF-12v2)

Subjective health status was also measured using the SF12v2. Both physical and mental component summary scores increased from baseline to six-months (Table 31) and this change was measured using a one-way, within-subjects ANOVA (one-tailed).

Table 31. *Mean SF12v2 summary component scores at baseline, three-, and six-months*

	SF12v2 Summary Component Scales			
	Mean	**Standard Deviation**	**Standard Error**	**Variance**
PCS				
Baseline	48.94	7.77	0.687	60.38
Three-Months	49.74	8.69	0.751	75.49
Six-Months	50.65	8.60	0.740	73.99
MCS				
Baseline	49.77	9.26	0.819	85.78
Three-Months	52.66	8.02	0.693	64.36
Six-Months	53.09	8.87	0.764	78.76

Note. Data only shown for n =136 who completed three health assessments (baseline, three-, and six-month). PCS = Physical Component Score, MCS = Mental Component Score.

In relation to the PCS of the SF12v2, a statistically significant change was found between baseline and six-month follow-up ($F_{(2, 254)} = 2.719$, $p = .035$, $d = .29$). Post-hoc analyses using paired *t*-tests and applying Tukey's HSD indicated that[18] a) mean three-month PCS score did not significantly differ from baseline (t (127) = -1.26, $p < .001$, CI 95% = -2.11 to 4.70, $d = -.10$) and b) mean six-month PCS score did not significantly differ from three-month scores (t (133) = -1.218, $p = .113$, CI 95% = -3.01 to -0.242, $d = -.10$). However, differences in mean PCS scores at baseline and six-months were statistically significant (t (133) = -2.33 $p = .011$, CI 95% = -3.01 to -.242), and represented a small effect size $d = .19$. Figure 28 illustrates the change in mean PCS scores from baseline to six-months.

[18] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010). T-test statistic was not equal to or greater than critical *t* for Tukey's HSD.

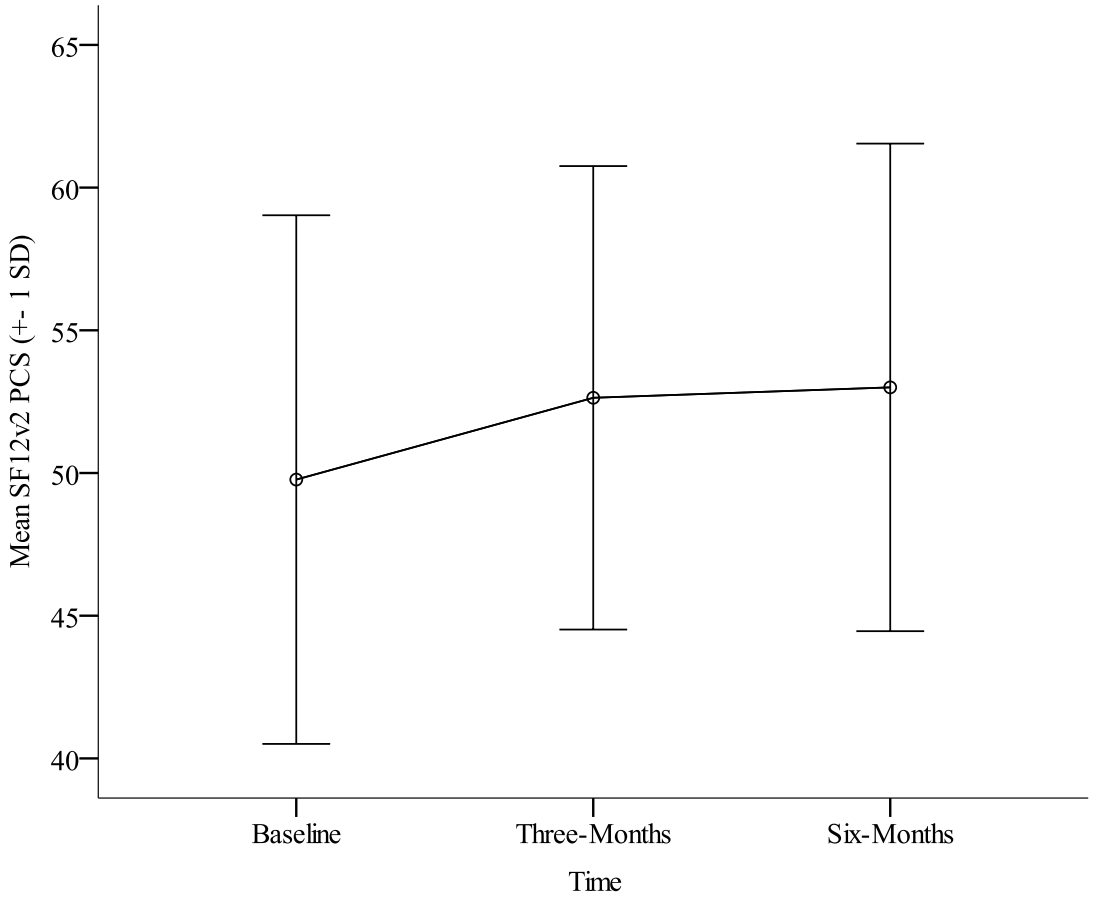

Figure 28. *Means and standard deviations (SD) of SF12v2 physical component summary scores at baseline, three-, and six-months*

In relation to the MCS of the SF12v2, a statistically significant positive change from baseline to six-month follow-up was found ($F_{(2, 254)} = 10.06$, $p < .001$, $d = .56$). Post-hoc analyses using paired *t*-tests and applying Tukey's HSD[19] indicated that a) mean three-month MCS score increased significantly from baseline (t (127) = -3.53, $p < .001$, CI 95% = -4.47 to -1.26), and represented a small to medium sized effect, $d = .33$, and b) mean six-month MCS score increased significantly from baseline (t (127) = -3.89, $p < .001$, CI 95% = -4.70 to -1.53), and represented a small to medium sized effect, $d = .36$. However, mean MCS scores at three-, and six-months did not significantly differ (t (133) = -.545 $p = .294$, $d = -.44$, CI 95% =-1.72 to .974). Figure 29 illustrates the change in mean MCS scores from baseline to six-months.

[19] Calculated using, df error, number of means to be contrasted and critical *t*-values for Tukey's HSD from Clark-Carter (2010).

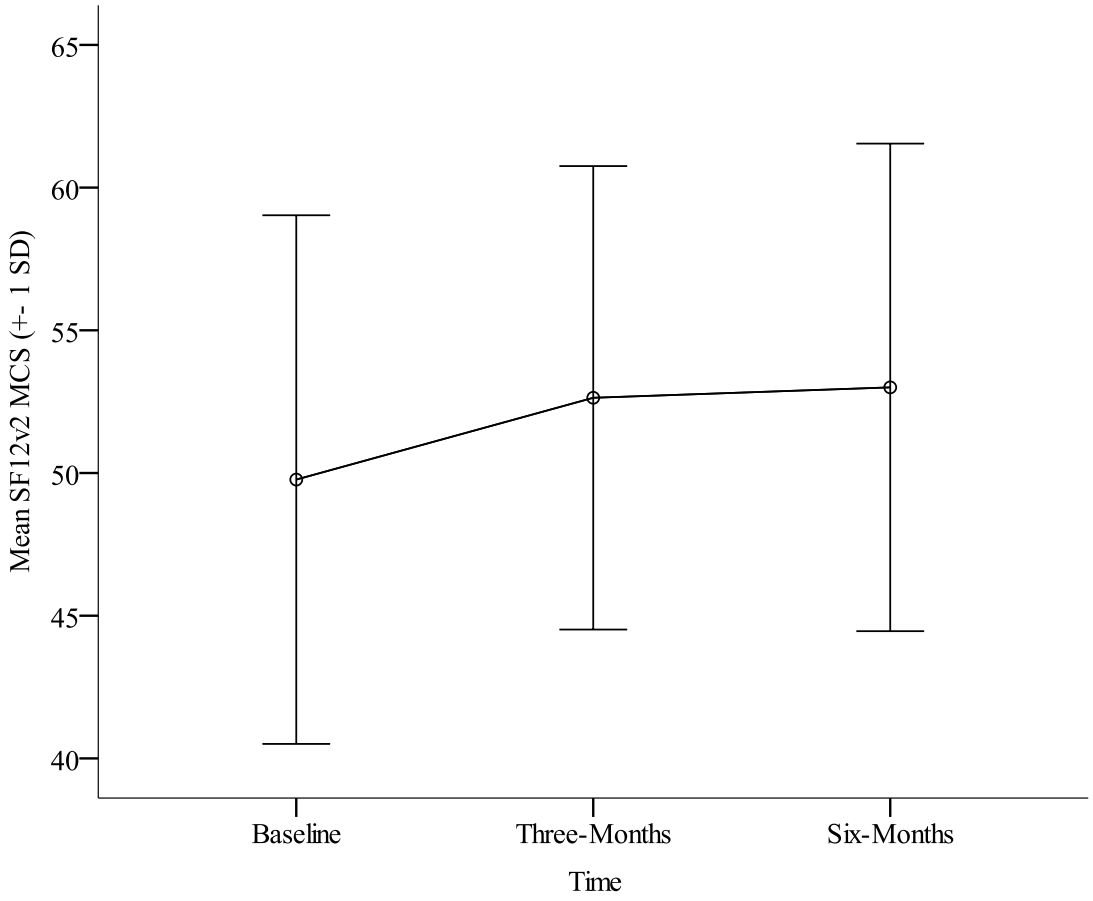

Figure 29. *Means and standard deviations (SD) of SF12v2 mental component summary scores at baseline, three-, and six-months*

4.3.5.10 Summary: Secondary Comparisons (Baseline, Secondary Three-, and Six-months)

The WTB programme was successful in achieving statistically significant (α-level = 0.05) positive changes in a number of objective and subjective measures of health status at six-month follow-up compared to baseline. However, significant improvements from three- to six-month follow-up were not seen in any outcome measure. There was a statistically significant positive change, from baseline to six-month follow-up in the primary outcome measure; TTM stage of change. Post-hoc comparisons identified that stage of change at three-month follow-up was significantly higher than at baseline and this was also the case for stage of change at six-month follow-up compared to baseline. However, stage of change at three- and six-months did not significantly differ. Significant changes, from baseline to six-month follow-up, were also found for a number of secondary outcome measures. For female participants, there was a

statistically significant decrease in WHR and waist circumference from baseline to six-month follow-up. Post-hoc comparisons identified a significant decrease in female waist circumference at three- and six-months compared to baseline. However, this was not found when comparing three- and six-month follow-up scores. For males, an overall significant change in mean waist circumference was found, however, post-hoc comparisons of each time point indicated no statistically significant change.

In relation to the TPB constructs, statistically significant changes were achieved in the positive direction for the behavioural intentions and attitude subscales from baseline to six-month follow-up. Follow-up tests revealed a significant increase in the behavioural intention subscale from baseline to three-month follow-up (but not baseline to three-months or three- to six months). Similarly, in relation to the attitude subscale, post-hoc tests indicated statistically significant changes in the positive direction from baseline to three-months and baseline to six-months (but not three- to six-months).

There was also a statistically significant change, from baseline to six-month follow-up, in perceived health status, as measured by the EQ-5D visual analogue scale. Follow-up tests identified a significant increase in perceived health status at three-months compared to baseline and also from baseline to six-month follow-up (but not three- to six-months).

Similarly, a statistically significant positive change in the mental component summary score (MCS) of the SF12v2, from baseline to six-month follow-up was found. Post-hoc comparisons identified a statistically significant increase from baseline to three-month follow-up and from baseline to six-month follow-up (but not three- to six-months). Mean PCS scores also significantly improved from baseline to six-month follow-up. Post-hoc comparisons found a statistically significant increase from baseline to six-month follow-up (but no baseline to three-months or three- to six-months).

In comparison, no statistically significant changes occurred from baseline to six-month follow-up in; BMI and BMI classification; WHR in males; diastolic blood pressure; and perceived behavioural control and subjective norm subscales (TPB).

4.4 Reasons for Participation

At their baseline health assessment, participants were asked to report their main reasons for participation (Appendix 6). Fifty-five percent (n = 929) stated that the vouchers offered as a reward in this project did not influence their decision to take part ('Not at all') (Table 32). Participants rated the pedometer (46.4%, n = 778) and the support provided by the project (89.9%, n = 1509) as important factors in their decision to take part in the project ('A lot'). Participants did not rate the town competition aspect (60.7%, n = 1018) or the link to the Olympics (61.1%, n = 1026) as important factors in their decision to take part ('Not at all').

Table 32. *A table to show the reasons of those participants who were recruited into the WTB intervention*

Reasons for taking part	**Incentive (Vouchers)**	**Pedometer**	**Support**	**Town Competition**	**Olympic Link**
	Freq (%)	**Freq (%)**	**Freq (%)**	**Freq (%)**	**Freq (%)**
A Lot	222 (13.2)	778 (46.4)	1509 (89.9)	178 (10.6)	163 (9.7)
A Little	478 (28.5)	416 (24.8)	93 (5.5)	406 (24.2)	409 (24.4)
Not at All	929 (55.4)	426 (25.4)	39 (2.3)	1018 (60.7)	1026 (61.1)
Total	**1629 (97.1)**	**1620 (96.5)**	**1641 (97.8)**	**1602 (95.5)**	**1598 (95.2)**
Missing	*49 (2.9)*	*58 (3.5)*	*37 (2.2)*	*76 (4.5)*	*80 (4.8)*

Note. Shaded area highlights the highest proportion of responses per reason.

4.5 Attrition

This section reports attrition rates and characteristics of participants who dropped out of the intervention at each time point.

4.5.1 Baseline to Three-month Attrition

Of the 1678 participants who received a baseline health assessment, 596 (35.52%) did not return for their three-month follow-up. Selected demographic and dependent variables were examined.

4.5.1.1 Demographic Variables

Age

Participants who completed a baseline health assessment and subsequently failed to complete a three-month health assessment were younger than those who continued (44.77±15.79 years vs. 53.59±16.79 years). A one-tailed, independent *t* test indicated that this difference was significant (*t* (1265.69) = -10.62, *p* <.001, CI 95% = -10.46 to -7.17)[20] and this represented a medium effect size, *d* = .54.

Gender

Of the participants who did not return for a three-month health assessment (n=596), 25.7% (n = 151) were male and 74.3% (n = 437) were female. This was similar to those who continued and completed a three-month health assessment (Male = 26.3%, n = 284 and Female = 73.7%, n = 795). A 2 x 2 χ^2 test was conducted to compare the proportions of males and females among those who completed their three-month health assessment and those who dropped out and a no statistically significant difference was found (χ^2 = .081, *df* = 1, *p* = .815, *d* = .014, N = 1667).

Location

In addition, analysis of the data demonstrated that there was no statistically significant difference between participants who completed a three-month health assessment and those who did not in terms of the town in which they resided (χ^2 = 8.15, *df* = 5, *p* = .148, *d* = .14, N = 1607).

Ethnicity

When comparing those who took part at three-months and those who dropped out, in relation to ethnicity, a statistically significant difference was found (χ^2 = 38.67, *df* = 13, *p* < .001, *d* = .31, N = 1638). Table 33 shows that, proportionally, 70% of participants at three-months compared to 60% of those who dropped out were White British. In addition, a higher proportion of Asian Indian participants dropped out compared to those who participated at three-months (8.0% and 5.6%, respectively). This indicates that a higher proportion of BME groups dropped out compared to those who continued.

[20] Equal variances not assumed (Levene's Test *p* < .05)

Table 33. *Ethnicity of those who participated at three-months and those who dropped out*

Ethnicity	Three-Month Participation		Three-Month Attrition	
	N	%	N	%
Asian Bangladeshi	56	5.3	55	9.5
Asian British	18	1.7	8	1.4
Asian Indian	59	5.6	46	8.0
Asian Indian Sikh	13	1.2	10	1.7
Asian Pakistani	42	4.0	30	5.2
Asian Yemeni	25	2.4	11	1.9
Asian Other	23	2.2	16	2.8
Black African	3	0.3	8	1.4
Black British	15	1.4	15	2.6
Black Caribbean	41	3.9	22	3.8
Black Other	3	0.3	6	1.0
White British	749	70.6	346	60.0
White Irish	11	1.0	2	0.3
White Other	3	0.3	2	0.3
Total	1061	100	577	100
Missing	21		19	

Occupation Status

When examining the occupation status of participants at three-months compared to those who did not continue from baseline, a statistically significant difference was found (χ^2 = 83.70, *df* = 5, $p < .001$, *d* = .47, N = 1598).

Table 34 shows that a higher proportion of employed individuals dropped out before their three-month health assessment compared to those who continued. In addition, a higher proportion of retired individuals (37.8%) participated at three-month compared to those who dropped out (15.9%).

Table 34. *Occupation status of those who participated at three-months and those who dropped out*

Occupation Status	Three-Month Participation		Three-Month Attrition	
	N	%	N	%
Employed	424	40.9	306	54.5
Unemployed	36	3.5	25	4.5
Retired	392	37.8	89	15.9
Student	40	3.9	30	5.3
Looking after home or family	124	12.0	97	17.3
Not stated	21	2.0	14	2.5
Total	1037	100	561	100
Missing	45		35	

4.5.1.2 Dependent Variables

Stage of Change

Baseline stage of change significantly differed between those who participated at three-months and those who dropped out (χ^2 = 21.49, *df* = 4, *p* < .001, *d* = .47, N = 1649). Table 35 indicates that the highest proportion of individuals who dropped out at three-months and those who continued were in the maintenance stage. A higher proportion of those who dropped out were in the preparation stage compared to those who continued (29.6% and 25.1%, respectively). Conversely, a higher proportion of those who continued were in the maintenance stage compared to those who dropped out (45.5% and 34.4%, respectively).

Table 35. *Baseline stage of change of those who participated at three-months compared to those who dropped out*

Baseline Stage of Change (TTM)	Three-Month Participation		Three-Month Attrition	
	N	%	N	%
Precontemplation	31	2.9	25	4.3
Contemplation	94	8.8	72	12.4
Preparation	268	25.1	172	29.6
Action	189	17.7	112	19.3
Maintenance	486	45.5	200	34.4
Total	1068	100	581	100
Missing	14		15	

BMI

A one-tailed, independent *t* test was used to examine the BMI of those who dropped out and those who continued after their baseline health assessment (28.99±5.94 kg/m^2 vs. 28.57±5.18 kg/m^2). No statistically significant difference was found (*t* (1673) = 1.50, *p* =.068, *d* = .08, CI 95% = -.130 to .965).

SF12v2

Differences were also examined in SF12v2 PCS and MCS scores between those who dropped out and those who continued. In relation to PCS, no statistically significant difference was found (*t* (1535) = .113, *p* =.455, *d* = .006, CI 95% = -.893 to 1.00). However, mean MCS scores for those who participated at three-month was higher than those who dropped out (50.09±9.60 vs. 48.31±10.08). This difference was statistically significant (*t* (1535) = -3.40, *p* < .001, *d* = .18, CI 95% = -2.81 to -.752).

EQ-5D

A one-tailed, independent *t* test was used to examine the mean EQ-5D score of those who dropped out and those who continued after their baseline health assessment Although, those who continued had a higher mean EQ-5D than those who dropped out (70.64±17.65 vs. 67.509±19.02) no statistically significant difference was found (*t* (1666) = -3.38, *p* < .01, *d* = .17, CI 95% = -4.97 to -1.32).

4.5.2 Three-month to Six-month Attrition

The study protocol required participants to complete a baseline and three-month follow-up health assessment in order to qualify for a reward. Participants were offered the opportunity to return for an optional six-month health assessment, however, no reward was offered for this additional attendance.

Of the 1082 participants who received their three-month health assessment, 136 returned at six-months. This is a low adherence rate, however, it is not known how many more individuals may have returned subsequently as the number of participants included in this analysis was dependent upon the cut-off time point implemented by Sandwell PCT. For the purpose of this evaluation, a dataset was presented to the researcher in March 2008. As the recruitment of participants was carried out in waves, participants were included in the dataset if they had completed their baseline and three-month health assessment at this time point (March, 2008). Such participants may have gone on to participate in the optional six-month health assessment; however, they would not have been included in this dataset.

Of the 1082 participants who received their second, three-month, health assessment 136 participants completed their third (optional) health assessment at six-months and 87.52% (n = 947) were lost to follow-up from three- to six-months. Selected demographic and dependent variables were examined.

4.5.2.1 Demographic Variables

Age

Participants who completed a six-month health assessment were older than those who completed a three-month health assessment and did not continue (62.41±14.90 years vs. 52.34±16.68 years). This difference was statistically significant t (1065) = -6.60, p <.001, CI 95% = -13.07 to -7.08) and represented a medium to large effect size, d = .61.

Gender

Of the participants who did not return for a six-month health assessment (n=947), 26.2% (n = 247) were male and 73.8% (n = 696) were female. This was similar to those who continued and completed a six-month health assessment (Male = 27.2%, n = 37 and Female = 72.8%, n = 99). A 2 x 2 χ^2 test was conducted to compare the

proportions of males and females among those who completed their six-month health assessment and those who dropped out after three-months. No significant difference was found (χ^2 = .063, *df* = 1, *p* = .835, *d* = .015, N = 1079).

Location

Similarly, analysis of the data demonstrated that there was no statistically significant difference between those participants who completed a six-month health assessment and those who did not in terms of participant location (χ^2 = 8.60, *df* = 5, *p* = .126, *d* = .18, N = 1046).

Ethnicity

When comparing those who took part at six-months and those who dropped out, in relation to ethnicity, a statistically significant difference was found (χ^2 = 31.03, *df* = 13, *p* = .003, *d* = .35, N = 1061). Table 36 shows that, proportionally, 82.8% of those participating at six-months were White British compared to 67.4% of those who dropped out (after three-months). In addition, a higher proportion of Asian Indian participants dropped out compared to those who participated at six-months (6.1% and 1.5%, respectively). This indicated that a higher proportion of BME groups dropped out compared to those who continued.

Table 36. *Ethnicity of those who participated at six-months and those who dropped out*

Ethnicity	**Six-Month Participation**		**Six-Month Attrition**	
	N	**%**	**N**	**%**
Asian Bangladeshi	2	2.2	53	5.7
Asian British	0	0	18	1.9
Asian Indian	2	1.5	57	6.1
Asian Indian Sikh	0	0	13	1.4
Asian Pakistani	6	4.5	36	3.9
Asian Yemeni	1	0.7	24	2.6
Asian Other	0	0	23	2.5
Black African	1	0.7	2	0.2
Black British	0	0	15	1.6
Black Caribbean	10	7.5	31	3.3
Black Other	0	0	3	0.3
White British	111	82.8	638	67.4
White Irish	0	0	11	1.2

White Other	0	0	3	0.3
Total	136	100	927	100
Missing	2		20	

Occupation Status

When examining the occupation status (at three-months) of participants who continued to six-months compared to those who dropped out, a statistically significant difference was found (χ^2 = 56.12, *df* = 5, *p* < .001, *d* = .48, N = 1037). Table 37 shows that a higher proportion of retired individuals (37.8%) participated at six-month compared to those who dropped out (15.9%). This is consistent with findings that those who participated at six-months were significantly older than those who dropped out after their three-month health assessment.

Table 37. *Occupation status of those who participated at six-months and those who dropped out*

Occupation Status	**Six-Month Participation**		**Six-Month Attrition**	
	N	**%**	**N**	**%**
Employed	25	19.1	399	44.0
Unemployed	4	3.1	32	3.5
Retired	87	66.4	305	33.7
Student	2	1.5	38	4.2
Looking after home or family	9	6.9	115	12.7
Not stated	4	3.1	17	1.9
Total	131	100	906	100
Missing	5		41	

4.5.2.2 Dependent Variables

Stage of Change

Stage of change (at three-months) significantly differed between those who participated at six-months and those who dropped out (χ^2 = 19.33, *df* = 4, *p* = .001, *d* = .27, N = 1078). Table 38 indicates that in both samples the majority of participants were classified in the action and maintenance stages of the TTM. A higher proportion of

those who dropped out were in the preparation stage compared to those who continued (7.2% and 1.5%, respectively).

Table 38. *Baseline stage of change of those who participated at six-months compared to those who dropped out*

Three-month Stage of Change (TTM)	Six-Month Participation		Six-Month Attrition	
	N	%	N	%
Precontemplation	4	3.0	32	3.4
Contemplation	4	3.0	58	6.2
Preparation	2	1.5	68	7.2
Action	27	20.0	278	29.5
Maintenance	98	72.6	507	53.8
Total	135	100	943	100
Missing	1		4	

BMI

A one-tailed, independent *t* test was used to examine the BMI (at three-months) of those who dropped out and those who continued six-months (28.43±5.10 kg/m^2 vs. 28.11±5.54 kg/m^2). No statistically significant difference was found (t (1079) = .704, p = .24, d = .07, CI 95% = -.597 to 1.26).

SF12v2

Differences were also examined in SF12v2 PCS and MCS scores (at three-months) between those who dropped out at and those who continued to six-months. No statistically significant difference was found for PCS (t (1058) = .260, p = .40, d = .002, CI 95% = -1.34 to 1.75) and MCS (t (1058) = -.047, p = .48, d = .004, CI 95% = -1.55 to 1.48).

EQ-5D

A one-tailed, independent *t* test was used to examine the mean EQ-5D (at three-months) score of those who dropped out at three-months and those who continued to six-months and no statistically significant difference was found (t (1078) = -.829, p = .20, d = .08, CI 95% = -3.91 to 1.59).

4.6 Pedometer Output

Table 39 illustrates the total number of pedometer steps completed by residents across Sandwell and the average daily steps taken by participants over the intervention period. The WTB intervention included the aspect of town competition, whereby participants were encouraged, as a town to try and complete the highest number of steps over the intervention period. When summing the number of steps taken by participants according to their town of residence, West Bromwich participants recorded the highest number of steps followed by Wednesbury. In comparison, Tipton and Rowley Regis residents collectively recorded the lowest number of steps over the intervention period (Table 39).

The highest proportion of participants, who completed their three-month health assessment (and, therefore, included in this analysis) resided in West Bromwich (28.7%). The town of Tipton was represented by the lowest number of participants (7.5%).

Table 39. *Pedometer output of WTB participants by town*

Town	**Sandwell Population***		**WTB Sample****		**Pedometer Output**	
	N	**% (Rank)**	**N**	**% (Rank)**	**Town Sum (Rank)**	**Avg. steps per day*****
West Bromwich	75,405	24.5 (1)	300	28.7 (1)	132,031,239	4,890 (5)
Smethwick	55,166	17.9 (2)	200	19.1 (2)	80,304,055	4,461 (6)
Olbury	50,641	16.4 (3)	161	15.4 (4)	80,799,590	5,576 (3)
Rowley Regis	50,257	16.3 (4)	139	13.3(5)	72,633,608	5,806 (2)
Tipton	38,777	12.6 (6)	78	7.5 (6)	37,063,912	5,280 (4)
Wednesbury	37,817	12.3 (5)	168	16.1 (3)	90,488,187	5,985 (1)
Total	**308,063**		**1046**		**493,320,591**	**5,240**

Note. Rank 1=high, 6=low, *2011 Census Key Statistics (Office for National Statistics, 2011b). **WTB sample = participants who had completed their three-month health assessment (n = 1082 (N= = 36 missing)) ***Average steps, per person, per day of the three-month intervention period.

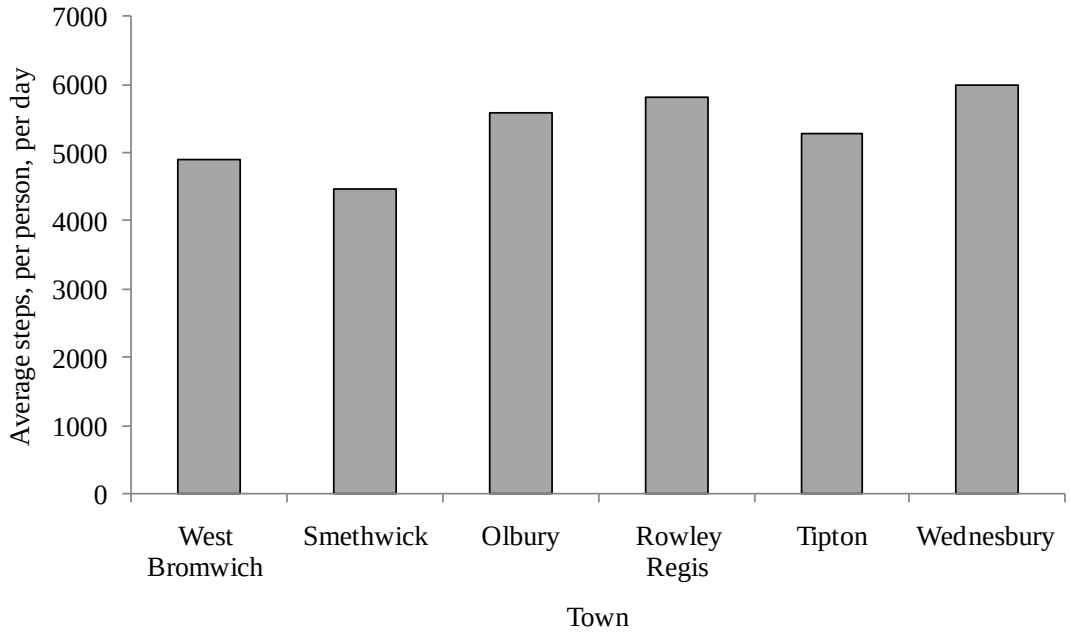

Figure 30. *Average number of steps taken by each WTB participant per day over the three-month intervention period. Data is presented by participant location*

As Figure 30 shows, participants from Wednesbury, on average, completed the highest number of pedometer steps over the intervention period (5,985 steps per person, per day of the intervention period). In comparison, participants from Smethwick recorded the lowest number of pedometer steps, on average accumulating 4,461 steps per day. Overall, participants walked, on average, between 4,500 and 6,000 steps per day over the intervention period. Approximately 2,000 steps equate to one mile and therefore participants were walking between 2.25 and 3 miles per day over the intervention period.

4.7 Allocation of Incentives

Fifty one percent of WTB participants received the Gold (£40) award (n = 456) and 48.5% (n = 435) received a Silver (£20) award. This indicates that the majority of participants, who attended both their first and second health assessment, returned their pedometer report card and made significant health improvements in at least one of the measures taken. No participant's received a Bronze (£10) award, which rewarded participants who returned for their three-month health assessment without any

subsequent health improvement. In relation to the type of reward preferred by participants, the grocery voucher was most popular with 62.9% (n = 990) preferring this voucher compared to 37.1% (n = 583) who preferred the high street voucher.

4.8 Summary

In total, 3006 participants registered with the WTB project. At baseline, 1678 participants received the intervention, an uptake rate of 55.82% (defined as the percentage of registered individuals who attended their baseline health assessment). Of the 1678 participants who received their baseline health assessment, 1082 participants went on to complete their second health assessment at three-months and 30.69% (n = 479) of participants who met the inclusion criteria were lost to follow-up. Of the 1082 participants who received their second health assessment 136 participants completed their third (optional) health assessment at six-months and 87.52% (n = 947) were lost to follow-up from three- to six-months.

Primary and secondary comparisons indicated that the WTB intervention was successful in achieving statistically significant (α-level = 0.05) positive changes in objective and subjective measures of health status at three-month and six-month follow-up compared to baseline. However, significant improvements from three- to six-month follow-up were not seen in any outcome measure. There was a statistically significant positive change in primary and secondary comparisons in the primary outcome measure; TTM stage of change. Post-hoc comparisons identified that stage of change at three-month follow-up was significantly higher than at baseline and this was also the case for stage of change at six-month follow-up compared to baseline. However, stage of change at three- and six-months did not significantly differ.

Results therefore suggest that participation in a three-month intervention comprising financial incentive, pedometer, health assessment and brief health advice to encourage walking can produce positive changes in objective and subjective measures of health status at three- and six-months compared to baseline. Results demonstrate that a three-month time frame is sufficient to elicit changes in both psychological and physiological measures, although larger effect sizes were found for subjective measures of health status at both three- and six-months. A significant change from three- to six-months was

not achieved in any objective or subjective measure of health status which brings into question the longer term impact of this type of intervention.

Overall, participants walked, on average, between 4,500 and 6,000 steps per day over the intervention period. Approximately 2,000 steps equate to one mile and therefore participants were walking between 2.25 and 3 miles per day. Overall, approximately half of WTB participants who completed the three-month intervention period received the Gold (£40) award and half received a Silver (£20) award. This indicated that the majority of participants, who attended both their first and second health assessment, returned their pedometer report card and made significant health improvements in at least one of the measures taken. No participant's received a Bronze (£10) award, which rewarded participants who returned for their three-month health assessment without any subsequent health improvement.

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Chapter 5

This chapter has presented information relating to an outcome evaluation of the WTB intervention, reporting the impact of the intervention on subjective and objective measures of health status. The following chapter will report findings from a process evaluation of the WTB intervention using a qualitative research methodology. Participants' experiences, attitudes and motivations towards physical activity and the use of financial incentives to promote behaviour change were explored. Chapter 5 presents findings from semi-structured interviews and focus groups followed by a discussion of the results and conclusions drawn.

Chapter 5: A Process Evaluation of the Walk to Beijing Intervention

5.1 Introduction

This chapter presents a process evaluation which is concerned with exploring participants' experiences, attitudes and motivations towards physical activity, incentivised health schemes WTB intervention participation. A qualitative methodology was used to provide insights and add depth to the findings from the outcome evaluation of the WTB intervention (Chapter 4). The rationale for employing a mixed methods evaluation approach was presented in Section 3.4.1. The justification for the qualitative methodology, including data collection and analysis, used in this process evaluation, along with ethical considerations are presented. This chapter then goes on to consider the findings from semi-structured interviews and focus groups followed by a discussion of the results and conclusions drawn. Researcher reflections relating to this process evaluation are presented in Section 7.8.

5.2 Methods

5.2.1 Reliability and Validity of Qualitative Research

It is important to assess the quality of the qualitative research in a way that is appropriate for the given population group (Yardley, 2000). The validity and reliability of qualitative research is frequently debated. This discussion centres around the appropriateness of assessing the validity and reliability in qualitative research as such terms stem from a positivist epistemology and therefore may hold less relevance (Guba & Lincoln, 1989). Alternatively, issues of trustworthiness, credibility, transferability and confirmability are highlighted as key considerations in the interpretivist paradigm (Richards, 2009). Nevertheless, the concepts and importance of validity and reliability still hold and are of concern to qualitative researchers (Richards & Morse, 2012). This section considers issues relating to reliability and validity in the context of this research.

Validity has been described as the extent to which researchers can ensure that data collection techniques and analysis methods address the issue under investigation (Willig, 2008). That is, establishing that the findings and conclusions presented actually

represent the data (Richards, 2009). The flexibility and open-endedness of qualitative research methods allows issues of validity to be addressed. Qualitative data collection techniques aim to ensure that participants are free to challenge, and if necessary, correct the researcher's assumptions about the meanings investigated by the research. Additionally, higher ecological validity can be achieved if data are collected in 'real world' settings. Reflexivity also plays an important role in ensuring the validity of a piece of research. Qualitative research acknowledges that the researcher influences and shapes the research process. Reflexivity is required on the part of the researcher in relation to the nature of involvement in the research process, and the way this shapes its outcomes, "reflexivity invites us to think about how our own reactions to the research context and data actually make possible certain insights and understandings" (p. 18) (Willig, 2008). Reflexivity ensures that the research process as a whole is scrutinised throughout and that researchers are continually reviewing their role in the research, which discourages impositions of meaning by the researcher and thus promotes validity.

Reliability refers to the replicability of the research; a measurement tool is reliable if it yields the same answer on different occasions (Willig, 2008). Replicability is argued to be less important in qualitative research as it explores the perspectives and interpretations of participants. The construction of knowledge is an individual process which is developed from the unique relationship between the interviewer and participant. However, other researchers argue that qualitative research, if applied appropriately and rigorously, can generate reliable results (Silverman, 2009). Making the process of knowledge construction clear allows the reader to understand how the particular interpretation was developed.

Yardley (2000) highlights the difficulties in evaluating qualitative research due to the diversity of methodological approaches and therefore, attempting to evaluate the validity of qualitative methods using fixed criteria would be inappropriate. The underpinning philosophies of qualitative traditions highlight the fact that experiences and our understanding of them are subjective and are derived from the construction of meaning by the researcher and participant. Yardley (2000) proposes that a number of factors need to be considered when evaluating the quality of qualitative research methodologies, including: sensitivity to context; commitment (to immersion in the data) and rigour (completeness of analysis); transparency and coherence (of methods and data

collection, clarity and power of description and fit between theory and methods); and impact and importance (theoretical, socio-cultural or practical).

For research to be considered credible and authentic investigations should be based on a sound rationale that justifies the use of chosen methodology and the processes involved in data collection and analysis. The following sections will provide the rationale for the data collection techniques and methods of analysis used in this research.

5.3 Data Collection Techniques

This research employed qualitative interviewing for the purpose of adding depth to the quantitative outcome evaluation of the WTB intervention. This research aimed to explore the experiences of individuals who had taken part in the WTB intervention. It was therefore essential to obtain rich data and to ensure the methods used allowed participants to provide their personal accounts and experiences. Semi-structured interviews and focus groups were deemed most appropriate as they allowed participants to express their personal experiences of taking part in this project. These are considered in turn.

5.3.1 Semi-Structured Interviews

There are a number of ways in which interviews can be conducted; unstructured, structured and semi-structured. Semi-structured, one-to-one interviews were considered most appropriate for the present research. The process for conducting semi-structured interviews is described in Section 5.6.5.

The semi-structured interview is a method of data collection that provides an "opportunity for the researcher to hear the participant talk about a particular aspect of their life or experience" (p. 24) (Willig, 2008). The questions asked by the researcher function as triggers that encourage participants to talk about their experiences. The semi-structured approach affords researchers a degree of flexibility, whilst retaining control over the interview situation (Richards & Morse, 2012). Semi-structured interviewing also allows the line of questioning to be adapted to the specific situation, giving researchers the opportunity to prompt, re-word and clarify topics under discussion.

The semi-structured interviewing technique involves establishing a set of questions in the form of an interview guide prior to the interview (Appendix 12). These questions could then be used as a guide for the researcher if the topic of conversation does not flow naturally during the course of the interview (Willig, 2008). The interviewer's role in a semi-structured interview is to facilitate and guide rather than dictate exactly what will happen during the encounter. Thus the interviewer uses the schedule to indicate the general area of interest and to provide cues when the participant has difficulties, however, the respondent should be allowed a strong role in determining how the interview proceeds (Smith, 2007). This is particularly important as the inductive nature of this research places emphasis on participant experiences of this intervention. It was essential that the questioning process was led by concepts the participant felt were important, rather than those deemed appropriate by the researcher (Richards & Morse, 2012). Semi-structured interviews can also be recorded which enables the researcher to focus exclusively on the participant, rather than making written notes, which will help the interview to flow naturally.

There are a number of attributes that characterise skilled interviewing (Willig, 2008). The skills required for eliciting rich data include active listening, the ability to be empathetic and non-judgmental, to allow the respondent's worldview to come to the fore and to facilitate the exploration of feelings.

Although some questions and topics are established in advance, interviewing is an iterative process, constantly adapted as the researcher's experience, confidence and understanding develops. The researchers' understandings of the situation and how to develop the most appropriate line of questioning improves throughout the research process. This can add depth of data reaffirming that the data obtained accurately reflects the participants' experiences.

5.3.2 Focus Groups

Focus groups provide an alternative data collection technique to semi-structured interviews. Focus group methodology involves engaging a small number of people (usually four to eight) in an informal group discussion, focused on a particular topic or set of issues or with a shared experience (Marks & Yardley, 2004). The researcher acts as a moderator, facilitating group discussion and actively encouraging group members to interact with each other. The interaction between research participants is a key feature

of focus group research, providing the opportunity for participants to comment, challenge, expand and discuss a particular topic or phenomena (Willig, 2008). Compared with interviews, focus groups are more 'naturalistic' and ideally, participants should interact with each other as they would with peers outside of the research setting. Focus group data also offers the possibility of analysing how people make collective sense of their individual experiences. Additionally, focus groups can help to achieve higher ecological validity, compared to one-to-one interviews, as it is a less artificial setting.

Within this research, a focus group methodology was used opportunistically and pragmatically. They consisted of pre-existing groups, (group of friends, n = 1; husband and wife couple, n = 2) or a new group (n = 1). All focus group participants had the shared experience of taking part in the WTB intervention. Additional characteristics of focus group participants can be found in Section 5.6.3. In some instances, individuals who had been recruited to take part in semi-structured interviews were accompanied by a significant other who had also taken part in the intervention. In addition, there was one instance where a participant had arrived for their interview at the incorrect time. A decision was subsequently made to capatalise on the advantages of the use of focus groups rather than lose the opportunity to gather additional qualitative data.

5.3.3 Comparison with Other Qualitative Data Collection Techniques

Qualitative data can also be collected using alternative methods and this section will consider the various merits and weaknesses of other data collection techniques.

In comparison to the semi-structured interview, the unstructured interview allows the interviewer to pose open-ended questions and interviewees to express their opinions freely. The interview is directed by both the interviewee and the interviewer and is not predetermined. This type of data collection does not allow for standardisation across different interviewees since each interview will be different. However, it is possible to generate rich data and information as the level of questioning can be varied to suit the context and the interviewer can delve deeper on specific issues and topics as they arise. This type of interviewing, however, is time consuming in both the completion of the interview and the transcription of audio data as interviews are usually of considerable length. Unstructured interviews are most appropriately used when the researcher seeks

to learn primarily about what matters or how procedures are understood by respondents (Richards & Morse, 2012).

An alternative interview technique is the structured interview. A structured interview involves the interviewer using a pre-determined set of questions which are short, specific and clearly worded. In most cases, these questions are closed and therefore, require precise answers usually in the form of pre-coded response categories. This type of interviewing is easy to conduct and standardise as all participants can be asked the same questions (Richards & Morse, 2012). Structured interviews are most appropriate when the goals of the study are clearly understood and specific questions can be identified. This methodology, however, does not allow for flexibility in terms of exploring issues or topics deemed important to the participant in more detail which was required in this piece of research.

Diaries have also been used as a data collection method in qualitative research. A diary is a record of personal experiences and events which is created by an individual. Diaries can be a rich source of qualitative data as they can offer an insight into the interpretations people make about their lives, everyday activities and behaviour. There are certain advantages associated with the use of diaries in qualitative research. Firstly, it is a physically unobtrusive method that does not require the researcher to be present. The use of diaries may therefore negate some of the practical issues encountered when organising qualitative data collection, such as location and timing. In addition, participants are able to make entries 'in their own time', as and when significant events or experiences unfold. This is in comparison with an interview or focus group which requires participants to recall events and experiences. Despite these advantages, diaries were not considered appropriate for a number of reasons. Firstly, diaries lack personal interaction and therefore do not allow for prompting or further investigation into a topic or issue. Secondly, diaries require participants to possess the literacy capabilities to express their experiences in written form (Willig, 2008). The latter issue could be particularly problematic in Sandwell, where 20% of residents have no educational qualifications, which is greater than the regional figure for the West Midlands (15.1%) and the 11.3% of UK residents with poor literacy levels (Office for National Statistics, 2012).

5.3.4 Rationale for the Selected Data Collection Method

In the context of this research, semi-structured, one-to-one interviews and focus groups were considered to be the most appropriate data collection methods that would yield the richest and highest quality data (Smith, 2007).

Semi-structured interviews facilitate the development of rapport between the interviewer and interviewee, allow greater flexibility in relation to coverage and allow the interview to proceed into novel areas producing richer data than other forms of data collection such as, structured interviews and participant diaries (Willig, 2008). In addition, the interaction allows the interviewer to pick up on non-verbal cues which may provide additional information, to provide prompts and to seek clarification where necessary. Similarly, a focus group methodology encourages participants to respond to, and comment on contributions made by others.

5.4 Data Analysis: Thematic Analysis

5.4.1 The Development of Thematic Analysis

Thematic analysis is a method for identifying, analysing and reporting patterns (themes) within data (Braun & Clarke, 2006). Thematic analysis is a flexible approach that can be used across a range of epistemologies and research questions. Thematic analysis can be conducted within both realist/essentialist and constructionist paradigms. An essentialist or realist approach reports experiences, meanings and perceptions of participants. On the other hand the constructionist method examines the ways in which events, realities and experiences are the effects of a range of discourses operating within a society (Braun & Clarke, 2006). Thematic Analysis can also be conducted within a 'contextualist' paradigm, positioned along the continuum between essentialism and constructionism. It is characterised by theories such as critical realism, which acknowledges the ways in which individuals make sense of their experience, and subsequently the wider social context, while retaining focus on the material and other limits of reality.

5.4.2 Comparison with other Methods of Qualitative Data Analysis

Various approaches to qualitative analysis have been developed, taking different perspectives and epistemological stances. In order to determine the most appropriate method of analysis in this study it was essential to assess the relative advantages and disadvantages of alternative methodologies. This section will consider such alternatives in relation to the research question postulated in this study.

Interpretative Phenomenological Analysis (IPA) aims to explore, in-depth, an individual's view of a particular phenomenon with importance given to the meanings an individual assigns to these experiences (Smith & Osborn, 2008). Phenomenological approaches seek to enter the world of the research participant and gain insights into idiosyncratic and culturally constructed factors relating to the individuals experiences (Shaw, 2001). The researcher, is therefore trying to establish an 'insider's perspective, rather than a factual, objective account (Conrad, 1987). IPA also emphasises the role of the researcher through a two-stage interpretation process, a double-hermeneutic, where researchers are attempting to make sense of the participants trying to make sense of their world (Smith, 2007). IPA was excluded as a realistic alternative to Thematic Analysis as this approach does not allow generalised conclusions to be drawn as to why experience is as it is. The research question in this study aims to explore the experiences of a group of individuals who are undertaking the same intervention and does not, therefore, seek to understand how participants are trying to make sense of their own idiosyncratic experiences.

Grounded Theory was developed by Glaser and Strauss (1967) and involves the progressive identification and integration of categories of meanings from data with the aim of building a theoretical analysis (Willig, 2008). Grounded Theory was developed to allow new, contextualised theories to emerge directly from the data with no predicted preconceived ideas of how the theory will transpire. Glaser and Strauss (1967) recognised the development of two different types of theories; substantive theory, explaining specific social processes developed from a narrow area of enquiry, and formal theory, a generalised theory dealing with a broader area of study. Grounded theory methodology allows the researcher to map the social processes and their consequences to the participants; however, it is not designed to explain the experiences of an individual (Willig, 2008). As the aim of this study was not to develop a new

theory but to inform future service provision in a pragmatic way Grounded Theory was excluded as an alternative method of data analysis.

Content Analysis is another method that can be used to identify patterns and themes across qualitative data. Content analysis often provides counts and allows for quantitative analyses of initially qualitative data (Ryan & Bernard, 2000). Thematic analysis differs from this in that themes tend not to be quantified. Content Analysis was rejected as a method of data analysis as it is a reductionist method with a loss of data due to the reliance on frequency counts (Wilkinson, 2003). Content Analysis also requires establishing a set of key terms which can then be searched for during analysis. This is therefore, a deductive rather than data-driven process, which is incommensurate with the current research aims to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health schemes and for taking part in this intervention. As a result, Content Analysis was deemed inappropriate for this research.

Discourse Analysis is concerned with the relationship between language, thoughts and feelings (Willig, 2008). Discourse Analysis emphasises the way in which versions of the world, of society, events and inner worlds are produced in discourse (Potter & Wetherell, 1995). A basic tenet of discourse analysis is that people use language to construct versions of the social world; that language is not a neutral and transparent medium through which people are able to express themselves, but is constitutive (Harré, Smith, & Van Langenhove, 1995). Discursive psychology has strengths in revealing the action-oriented nature of language and its achievements within specific contexts; however, it does not provide insights into the individual's inner experience. This method of analysis was rejected as this study was not concerned with or focused on the language used by participants, but to ascertain a global picture of the participant's experience of the WTB intervention.

Narrative approaches (Riessman, 1993) to data analysis allow researchers to understand how participants construct meaning, make connections between events and interpret them and bring order to experience (Willig, 2008). However, such methods do not shed light on what actually happens to participants and how such events affected them at the time of their occurrence, which was central to this part of the evaluation.

Despite the relative merits of alternative qualitative methodologies discussed here, an inductive approach to Thematic Analysis from an essentialist, realist perspective was

deemed the most appropriate method of analysis for the present study. The rationale for this data analysis method presented in Section 5.4.3.

5.4.3 Rationale for the Selected Analysis Method

The epistemological approach taken in this Thematic Analysis of the WTB project data was from an essentialist, realist perspective. This study reports experiences, meanings and perceptions of participants, rather than examining the ways in which events, realities, meanings and experiences are the effects of a range of discourses operating within society as in a constructionist perspective (Braun & Clarke, 2006).

Thematic analysis was chosen for its flexibility, which allows a full exploration of the data without the constraints of methods such as Interpretative Phenomenological Analysis or Grounded Theory analysis, which are more theoretically bounded (Braun & Clarke, 2006). Thematic analysis enabled the identification and description of barriers and facilitators to participation in physical activity and intervention implementation and evaluation. It allows themes to be produced both deductively where they are generated by the researcher based on previous theory and research literature before analysis and inductively, from the raw data itself (Wilkinson, Joffe, & Yardley, 2004). In this piece of research, an inductive approach to data analysis was undertaken and as such, where possible, prior assumptions were avoided. It was essential that findings drawn from this research were based on the data presented and themes developed were representative of the experiences of participants. Previous research was then used to contextualise the findings.

Yardley (2000) highlighted that evaluating the validity of qualitative methods using fixed criteria is difficult and inappropriate as the underpinning philosophies of qualitative traditions highlights that experiences and our understanding of them are subjective and are derived from the construction of meaning by the researcher and participant. Nevertheless, the concepts and importance of validity and reliability still hold and are of concern to qualitative researchers (Richards & Morse, 2012). Braun and Clarke (2006) have identified a number of criteria that can be employed to enhance the quality of Thematic Analysis. Firstly, it is essential to be explicit regarding the underlying assumptions and specific approach taken in conducting Thematic Analysis. As previously mentioned, in this study inductive Thematic Analysis was conducted from an essentialist, realist perspective with congruence between the stated approach

and the actual approach undertaken. The researcher should also be positioned as active in the research process, where the analysis of the data is deliberate and consciously created in order to persuade the reader of the plausibility of the findings (Braun & Clarke, 2006). Rigour is also enhanced through careful transcription. In this study verbatim transcripts were checked against audio tapes and assessed for accuracy. During coding rigour is enhanced by ensuring that each item is given equal and thorough attention and by working systematically through the entire data set. It is also important to avoid the anecdotal approach that is, generating a pattern or theme from a few instances of a phenomenon. In addition, relevant extracts to support each theme should be collated and themes should be checked against each other and with the original data set to ensure that themes are coherent, consistent and distinctive. To further improve rigour in Thematic Analysis, the researcher should ensure that the data are analysed and interpreted, not merely described, and extracts should be used as illustrative examples of analytic points that go beyond their specific content (Braun & Clarke, 2006).

5.5 Ethical Considerations

It is important that the participants' psychological and physical well-being, health, values and dignity are respected in all areas of research (Banister et al., 2011). The following will detail the ethical considerations applicable to this evaluation, with a brief explanation indicating their relevance and action taken by the researcher to ensure the well-being of participants. Ethical approval was gained from Staffordshire University's ethics committee prior to commencement of data collection (October 2007) and this study followed BPS ethical guidelines (British Psychological Society, 2009).

5.5.1 Informed Consent

Written, informed consent was obtained prior to interview. It was essential to ensure that participants were given ample opportunity to understand the nature, purpose, and anticipated consequences of research participation, allowing informed consent to be obtained. All participants were provided with two opportunities to read the project information sheet (accompanying the invitation letter to participate and prior to interview commencement) (Appendix 14a and 14b). Participants were then required to sign a consent form before participating in the study (Appendix 15). Participants were

only asked to sign the form when they understood what participating in the research entailed. Participants were also made aware that signing the consent form would not affect their right to withdraw from the research in any way (consent form; Appendix 15).

5.5.2 Deception

There were no attempts to deceive participants in relation to the nature of the investigation. All participants had taken part in the WTB intervention for at least three months and the nature of the interview was explained to participants in a written (information sheet; Appendix 14a and 14b) and verbal format.

5.5.3 Anonymity and Confidentiality

Each participant was asked to select a pseudonym to ensure all views expressed remained anonymous. Only the researcher was aware of the participant's identity. Any personal information obtained during the interview that could identify a participant was excluded from transcription and analysis. It was also explained to participants that data could not be confidential as quotes from the research might be used in written reports and presentations, although these would be presented anonymously.

5.5.4 Participant De-Briefing

Participants were debriefed by the researcher at the end of the interview and any questions they had were answered honestly and as fully as possible. They were also reminded of how their interview would be used and made aware of any potential further involvement.

5.5.5 Withdrawal from the Investigation

From the outset participants were made aware of their right to withdraw from this investigation at any time, without the requirement to provide a reason. Additionally, in the light of experience of the investigation, or as a result of debriefing, the participants were informed that they had the right to withdraw consent retrospectively, and their data, including recordings would be destroyed.

5.5.6 Protection of Participants

Investigators have a primary responsibility to protect participants from physical and mental harm during the investigation. In the planning of this investigation it was essential to consider all research from the viewpoint of the participant, in order to eliminate potential risks to psychological well-being, physical health, personal values, or dignity (British Psychological Society, 2009). To protect participants from physical or mental harm during this study, individuals were invited to attend their interview immediately after their three- or six-month health assessment. All participants had therefore visited and were familiar with the interview location on at one least occasion. In addition, the WTB health assessor was present outside the interview room during data collection. Participants were also provided with contact information for Sandwell PCT and the researcher.

5.5.7 The Right to See Results

The participants were also told that they had the right to view the interview transcripts prior to analysis. Any information they felt was misrepresented or could be used to identify them was removed. Participants also had access to summary and final reports of the investigation provided to Sandwell PCT.

5.5.8 Invasion of Privacy

The semi-structured interviews took place immediately after the participants had received their three- or six-month health assessments with the aim of reducing participant burden. Consequently, the locations for semi-structured interviews were local leisure facilities, social clubs, YMCA's or community centres. Participants were able to select the time of their health assessment and subsequent interview from a number of options, which were scheduled by Sandwell PCT. No individuals took part in the study unless it was their expressed wish to do so. Participants were under no pressure to take part and were able to withdraw at any time without providing a reason.

5.6 Process and Methods of Data Collection and Analysis

5.6.1 Setting

A total of 24 semi-structured interviews and focus groups were conducted in local community centres and public venues including leisure centres and public libraries in various locations across Sandwell, West Midlands. Participants were selected for follow-up at three-, and six-months and interviews were conducted immediately after the participants' health assessment.

5.6.2 The Interviewer

The interviews were conducted by a 25 year old, white, female, researcher employed by Staffordshire University (GH). The interviewer is a reasonably fit individual who participates in competitive sport (netball and hockey) on a regular basis and has a keen interest in health and fitness. All semi-structured interviews and focus groups were conducted by the same interviewer.

5.6.3 Sampling and Recruitment

Randomly sampled (by computer generated numbers) participants were selected for follow-up at three-, and six-months. A total of 30 males (n = 9) and females (n = 21) participated in either semi-structured interviews (n = 20) or focus groups (n = 4). Participants ranged from 24 to 78 years of age. The mean age of participants was 54.6 years with a standard deviation of 16.56 years (Table 40). All participants had attended at least one follow-up health assessment (at three- or six-months). This sample reflects the larger sample recruited in the outcome evaluation of the WTB intervention (mean age 50.5±17.0 years; 73.9% female; Section 4.3.3).

Table 40. *Background information relating to semi-structured interview participants*

ID	Pseudonym	Gender	Age	Ethnicity	Town
Three-month semi-structured interviews					
3.1	June	Female	53	White British	Rowley Regis
3.2	Des	Male	45	Asian British	West Bromwich
3.3	Georgia	Female	49	White British	West Bromwich
3.4	Maria	Female	32	White British	Tipton

3.5	Gurdeep	Male	44	Asian British	Tipton
3.6*	Pat	Female	74	White British	Smethwick
	Diane	Female	68	White British	Smethwick
	Derek	Male	76	Black Caribbean	Smethwick
	Sharon	Female	65	White British	Smethwick
3.7	Joanne	Female	28	White British	West Bromwich
3.8	Sarah	Female	30	White British	West Bromwich
3.9	Susan	Female	58	White British	Tipton
3.10	Helen	Female	34	White British	Tipton
3.11	Lauren	Female	24	White British	Wednesbury
3.12	Margaret	Female	48	White British	Wednesbury
Six-month semi-structured interviews					
6.1	Patricia	Female	68	White British	West Bromwich
6.2	Jane	Female	71	White British	Tipton
6.3	Valerie	Female	69	White British	Smethwick
6.4	Kate	Female	46	White British	Smethwick
6.5	Paul	Male	42	White British	West Bromwich
6.6*	Eileen	Female	70	White British	Wednesbury
	Brian	Male	70	White British	Wednesbury
6.7*	Jillian	Female	71	White British	Wednesbury
	Alfred	Male	71	White British	Wednesbury
6.8*	Michael	Male	38	White British	Smethwick
	Trevor	Male	78	White British	Smethwick
6.9	Claire	Female	40	White British	West Bromwich
6.10	Louise	Female	63	White British	Tipton
6.11	Julia	Female	47	White British	Tipton
6.12	David	Male	59	White British	Tipton

* Indicates individuals who participated in focus groups. All other individuals took part in semi-structured, one-to-one, interviews. Each participant was asked to select a pseudonym to ensure all views expressed remained anonymous.

5.6.4 Pilot Focus Group Interviews and Semi-structured Interview Schedule Development

In order to develop an interview schedule prior to undertaking qualitative data collection, a number of procedures were employed. Firstly, previous literature on determinants and issues relating to exercise behaviour was considered. In addition, the

ten processes of change associated with the Transtheoretical Model of Behaviour Change (Prochaska & DiClemente, 1983; see Chapter 2, Section 2.4.1) were used to inform the production of a general interview schedule for use in two pilot focus groups. Key topics covered in this schedule included: understanding of good health/healthy lifestyle; barriers; facilitators; information needs; motivation and motivators; and the value of incentive programmes. Possible prompts were also identified for use in the interview if the initial question was insufficient to elicit a satisfactory response (Appendix 11).

In order to test the coverage and effectiveness of the potential interview schedule two pilot focus groups were conducted. These pilot focus group interviews were conducted with existing walking groups within Sandwell which were identified by Sandwell PCT. Focus group one contained seven individuals (three male, four female) with an average age of 62.25 years and focus group two was conducted with six individuals (two male, four female) with an average age of 66.3 years. Each focus group session was audio-taped and lasted approximately 60 minutes.

Pilot focus group interviews were used to test possible lines of questioning and to identify other issues that may not have transpired from relevant literature when designing the interview schedule. In addition, these pilot focus groups were invaluable in allowing the researcher to become familiar with potential responses (Smith, 2008).

Following pilot focus groups, a number of changes were made to the pre-established questions, particularly in the wording of some questions. The resultant semi-structured interview schedule can be found in Appendix 12.

5.6.5 Procedure

In order to recruit participants, a letter of invitation and an information sheet were sent to each of the selected participants. The NHS-affiliated letter outlined the purpose of the study and requested that they read the information sheet that was enclosed (Appendix 13a, 13b, 14a and 14b). The information sheet provided details of the qualitative investigations including what was expected of the participants. If participants could not attend the originally specified date and/or location, an alternative was offered. Qualitative data collection took place immediately after the participants had received their three- or six-month health assessments and therefore the locations for semi-

structured interviews and focus groups were local leisure facilities, social clubs, YMCA's or community centres. Participants were given a £10 (supermarket) voucher as a token for taking part.

The methods of data collection employed have been identified as being appropriate tools for the exploration of a range of opinions in health research (Ritchie & Spencer, 1994). The semi-structured interviews were conducted in the following stages.

(1) Introductions: as the semi-structured interviews took place after the participants' three- or six-month health assessment the researcher was introduced to the participant by the health assessor. The researcher was introduced as a research associate from Staffordshire University.

(2) Participants were then introduced to the research which included an explanation of the purpose of the interview, the expected duration of the interview (approximately 30 minutes) and why they were chosen (selected at random). During this stage, participants were also provided with a second copy of the information sheet and an informed consent form (Appendix 15). The informed consent form required participants to specify whether or not they were willing to participate, and to provide their name, signature and date. It was also highlighted verbally that all data would remain anonymous as false names would be used in the production of the report. Participants were also told that the interview would be recorded using a digital dictaphone and stored on a pass-coded computer in a secure room. If the participant provided written consent at this stage the interview would begin.

(3) The interview began with the researcher stating that there are no right or wrong answers and that they would not be judged on what they say as the research focuses on their individual experiences of the project. An interview guide was used to facilitate the interview; however, the participant dictated the flow of the interview. Participants were firstly asked about how they became involved in the project.

(4) Ending the interview involved asking participants if they would like to add anything else to the discussions. Participants were made aware that they would be given the opportunity to review the transcript of their interview and that they would be contacted via post. The researcher then thanked the participant for their time.

5.6.6 Process of Analysis

This section considers the process undertaken during data analysis. Interview data was transcribed verbatim and analysed using Thematic Analysis (Boyatzis, 1998; Braun & Clarke, 2006). Within this study, an exploratory, qualitative approach was used to gain an insight to the experiences, attitudes and beliefs of individuals taking part in the WTB project using an inductive approach.

A summary of the process of analysis is provided in Table 41. It is important to note that, although presented as a linear, step-by-step procedure, analysis was conducted using an iterative and reflexive process (Braun & Clarke, 2006).

Table 41 presents an outline guide for conducting Thematic Analysis and a brief summary of the processes involved in each phase are provided. It is important to note that, although presented as a linear, step-by-step procedure, analysis was conducted using an iterative and reflexive process (Braun & Clarke, 2006).

Table 41. *Phases of Thematic Analysis*

Phase	Description of the process
1. Familiarising yourself with the data:	Transcribing data, reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic map of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating the analysis back to the research question and literature, producing a scholarly report of the analysis (Appendix 17 for example quotation annotation).

Note. Braun and Clarke (2006)

The process of data analysis began during data collection as the researcher first became aware of participant responses and experiences of the WTB intervention. During transcription, the researcher became aware of the potential themes that are likely to emerge which initiates a period of familiarisation with the data. Bird (2005) argued that transcription should be seen as a key phase of qualitative data analysis and it is recognised as an interactive act, where meanings are created as it forms the early stages of analysis (Lapadat & Lindsay, 1999). Interviews were transcribed verbatim using Microsoft Word and page numbers and continuous line numbering were used to provide a reference to the original transcript for quotations included in results reported in this chapter. The transcription conventions employed in this study are outlined in Appendix 16.

Following this, the researcher further immersed herself within the data through a process of reading and re-reading the interview transcripts as it is essential that the researcher is familiar with the depth and breadth of the content (Braun & Clarke, 2006). During familiarsation the researcher was required to read the data in an active way, searching for patterns and meaning and develop initial analytic thoughts. During this phase, notes and comments were made relating to the data and potential ideas for emergent themes were formed.

The next phase of the analysis process involved generating initial codes within the data. This process of coding is part of the analysis which aids the researcher to organise the data into meaningful groups and reduce the data into a more manageable format (Braun & Clarke, 2006). Codes are used to identify features of the data that are interesting to the researcher, they signify the most basic element of the raw data that can be assessed in a meaningful way and a "good code" is one that captures the qualitative richness of the phenomenon under investigation (Boyatzis, 1998). Initial coding of the transcripts was conducted by hand and initial codes were generated following familiarisation through transcription and re-reading the subsequent transcripts. Each interview was 'coded', which involved identifying summaries, associations and connections within the data. As this part of the research was inductive and data-driven, coding was not conducted in light of previous literature the themes developed therefore depended on the content of the data. To illustrate the approach taken an annotated transcript is provided in Appendix 16.

Following the coding of transcripts the next phase involved searching for and collating potential themes within the data set and gathering all data relevant to each theme. This involved identifying clusters of codes, considering how different codes may combine to form an overarching theme. The criteria used for identifying potential themes were based on the researchers' interpretation of relevance, however, no data were excluded from the process. During this phase the researcher began to develop an idea of the potential relationships between codes, themes and different levels within a particular theme (e.g. master themes and sub-themes within them). At this point, each transcript was annotated with potential codes (left-hand side) and potential themes (right-hand side) as illustrated in Appendix 16. To facilitate this process tables were used to list codes into potential master-themes and sub-themes with reference to supporting extract locations within the transcripts. Each theme was cross-referenced using transcript numbers, page numbers and line numbers (see Appendix 18 for an example). A sample of transcripts were then selected and reviewed by a second researcher (Supervisor, SG). The themes generated were then discussed between the researcher and supervisor.

The next phase involved reviewing and refining the identified master themes and sub-themes checking if they worked in relation to the coded extracts and the entire data set. The identified clusters of themes were re-checked with the original transcript to ensure authenticity and assessed in relation to whether there was enough data to support them. At this point some candidate themes were refined, for example, collapsing two themes into one or separating one theme into two. During this phase the researcher engaged in discussions with the supervisor to ensure that data within themes were coherent and compatible whilst retaining clear and identifiable distinctions between themes (Braun & Clarke, 2006). A thematic map of the analysis was then developed for each master theme, and an assessment of whether this map accurately reflected the meanings in the data set was performed. Once master- and sub-themes were agreed and the thematic map was an accurate reflection of the data, ongoing analysis was conducted in order to refine the specifics of each theme, generating clear definitions and names for each theme.

In the next section, key themes are identified, explained and discussed in relation to current literature.

5.7 Results and Discussion

Analysis of the interview and focus group data revealed five master themes;

1. **Initial Motivation for Participation:** ***'Obviously to do something for myself, I'd like to do a bit more walking and obviously, like, the incentive'***
2. **Motivators and Tools:** ***'It was encouraging me to come and see the progress and that made me want to do more'***
3. **Outcomes:** ***'I feel better for it...physically and mentally'***
4. **Barriers:** ***'It's just hard sometimes to fit it in'***
5. **Evaluation:** ***'It's important to have this kind of project'***

These master themes were subsequently split into sub-themes, which are discussed in detail below. Descriptions of each master and sub-theme incorporate direct quotes from participants to illustrate and describe opinions held. Where illustrative quotations are used, pseudonyms have been used to protect participant anonymity. Models of each master theme are included (Figure 31, Figure 32, Figure 33, Figure 34 and Figure 35) and referred to throughout this section. Directional arrows will illustrate the relationship between master themes and sub-themes in each model. The directional arrows will also be identified as either primary or secondary connectors. Primary connectors demonstrate links to the master theme and secondary connectors provide links between sub-themes.

1. Initial Motivation for Participation: ***'Obviously to do something for myself, I'd like to do a bit more walking and obviously, like, the incentive'.***

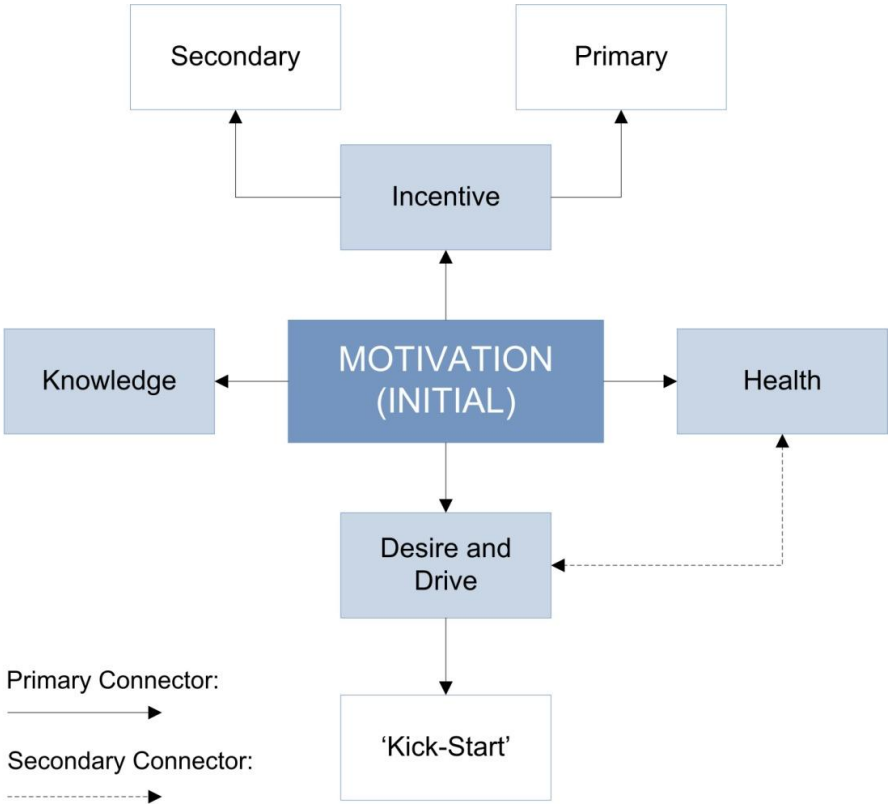

Figure 31. *Model of the 'initial motivation' master theme and associated sub-themes*

The model depicted in Figure 31 illustrates the relationships between the master theme and its associated sub-themes identified in the interviews. When asked about their reasons for taking part in the project participants provided a variety of motives. The reasons cited by participants included; health, knowledge and awareness, drive and the reward.

Health: ***'The health benefits sort of swayed it for me'***

A number of participants cited multiple reasons for taking part in the WTB project. A main motive that came across from numerous participants was that of health promotion. Participants' viewed the intervention as a way of encouraging them to live a healthier lifestyle. This is illustrated in the quote provided by Jane;

"It was getting fitter actually, losing a bit of weight, being more healthy, it was everything really, just a combination of all of those".

Jane (2; 32-33)

Here, Jane reports several reasons for her participation in the WTB intervention including improving fitness, losing weight and generally living a healthier lifestyle. The idea of leading a healthier lifestyle was also discussed by Julia;

"I just thought it's a good thing, nobody can say 'oh, I don't need that, I'm fit enough', 'cos you don't know. It's preventative to me. I think that if...yes, I know I'm carrying weight and I could do more exercise than I do, sort of thing, but you don't know. I mean, like, heart attacks and things are just waiting to happen. It's out there and rather than wait until it does and then you've got to do something. Why not try and conduct your lifestyle so that it is, hopefully, you know, stopping the inevitable from happening".

Julia (2-3; 5-63)

Julia also highlights the importance of preventative action in relation to her health. This was also reported by other participants as a motivating factor in their decision to take part in the WTB intervention.

Knowledge and Awareness: *'Well, I did want to find out things, like my blood pressure'*

For other participants, the WTB project provided a vehicle to access knowledge about their own health status as well as the knowledge of health care professionals. Here Des describes his initial motivation for taking part;

"For me, it was just a way of finding out about your health, you know, your blood pressure and things like that".

Des (7; 174-175)

Increasing health-related knowledge and awareness of personal heath states was cited as initial motivating factors. For example, Trevor stated that, for him, a motivating factor was the opportunity to compare his perception to reality in relation to his activity levels;

"I wanted to see how my impression of my physical activity actually measured up to the whole kind of measured walking, kind of thing".

Trevor (1; 14-16)

This also relates to ongoing intervention motivators that have been highlighted by participants, including the use of a pedometer to monitor behaviour and subsequently increase knowledge and awareness of existing levels of physical activity.

Desire and Drive: *'This is a really, really good kick start'*

Throughout discussions one of the most commonly emerging theme was that of desire and drive. The initial motivation for some participants was the use of the WTB project as a push to change their own behaviour. Some participants perceived the project as a method of encouraging and motivating a change in their behaviour, for instance, it *'gave me the push'*, it *'was a kick start*'. Susan and Lauren demonstrate this point of view;

"...I suffer with a health problem, I suffer with fibromyalgia and I was feeling sorry for myself and not doing as much as I did before and this just gave me the push".

Susan (1; 14-16)

In addition, Laura highlighted that a sense of embarrassment at her lack of activity was a factor which influenced her desire and drive to change her behaviour.

"...The fact that I don't walk basically, erm, like I said earlier [to the health assessor] I just, I literally live five minutes from where I work and I drive every day and I was slightly embarrassed by that. So I needed something to motivate me to actually walk".

Lauren (2; 47-49)

The concept of 'drive' was experienced by a number of participants and it seemed to play a big part in an individual's initial motivation. Individuals taking part in the WTB project demonstrated desire to try and increase their levels of physical activity. For example, the quote provided by Jane below highlights why she had the desire to take part in the WTB intervention;

'I just thought it was a good thing. I thought it would get me walking, which I wanted to do and I knew that I should be doing, but sometimes you sit there and you think 'I can't tonight, I'll go tomorrow" and it puts you off but I thought that it [WTB] would do me good".

Jane (2; 31-34)

This quote demonstrates that for Jane, the WTB intervention could potentially be a way of motivating her to do something that she wanted to and something that she knew she

should be doing. This sub-theme was also associated with the initial motivation, 'desire and drive' to improve their health status. Figure 31 illustrates the secondary connection between desire and drive and health.

The Incentive: *'You got that incentive just to do a bit more'*

This process evaluation identified a distinction between individuals who were highly motivated by the presence of a reward and individuals who were motivated by other internal or external factors. The presence of a financial incentive within the WTB project was perceived, principally in one of two ways; it was either a primary or secondary motivational factor in their decision to take part.

Primary Factor: *'Well, to be quite honest, £40 at the end of it'*

Participants who perceived the financial incentive as having a primary impact on their motivation and decision to take part placed a high value on the reward. These participants were honest in their revelation that the chance to receive an extrinsic reward ultimately had an impact on their decision to take part. For instance, the following quote from Margaret illustrates her motivation for taking part in the WTB intervention;

"...Because to be honest that's why I, you know, I saw it and thought ooh vouchers somat to like do and I thought well I'll start it and get a voucher and then start doing it, but obviously, you have to wait for em [the vouchers]".

Margaret (9; 238-240)

Secondary Factor: *'It was just a bonus really'*

In comparison, others perceived the financial incentive as a secondary motivational factor in their decision to take part in the project and therefore a low value was placed on the reward. The financial incentive was not the primary motivator; other factors such as improving health were the primary reason for taking part for these individuals. Susan illustrates this view in the following quote;

"He [health assessor] asked me if that interested me, I says not really, with me, that is nice don't get me wrong, but err, what interested me the most was to push myself because I really needed that shove because I'm only 4'11'' and 74kg is a lot, but I've got three children, you know so I've had caesareans but it was just the motivation to do something and I think the reward was just a bit of a bonus. It's nice".

Susan (4; 103-107)

A number of participants in this group stated that the incentive was an extra bonus and that they would have taken part in the project regardless of the offer of a reward. The following quote provided by Georgia illustrated this point of view;

"That [the incentive] wasn't really the thing that made me say, yeah, I'll do it. It was just a bit of a bonus really. I mean it was good but I think I would have done it anyway".

Georgia (5; 127-128)

There were several additional perceptions held in relation to the financial reward. For instance, for some participants the presence of a reward was a ***motivating*** factor. In comparison, other participants suggested that it was a ***goal*** to aim for. The reward provided something extra to achieve in addition to the associated health benefits of taking part in physical activity. Other participants felt the financial incentive rewarded them for carrying out the practical aspects of the project, such as keeping a record of their daily steps, rather than a reward for improving their health.

The initial motivations cited by participants of the WTB project can be linked to the Self-determination theory proposed by Ryan and Deci (2000b). According to Self-Determination theory (Section 2.4.3), individuals are intrinsically motivated when they engage in an activity for the inherent satisfaction that they derive from the activity, for example, interest value, desire for a challenge, competence of skills and enjoyment. Individuals are extrinsically motivated when they engage in an activity for separable outcomes that they attain through the activity, whether rewards are attained or punishments avoided. Therefore a number of participants were intrinsically motivated to take part in the intervention, i.e. *"I have enjoyed doing it [walking]" (Georgia, 4; 130),* whereas other individuals were extrinsically motivated through the presence of a reward for taking part in the project and making significant health improvements, i.e. *"well, to be quite honest, £40 at the end of it" (Diane, 2; 42).*

2. Motivators and Tools: ***'It was encouraging me to come and see the progress and that made me want to do more'***

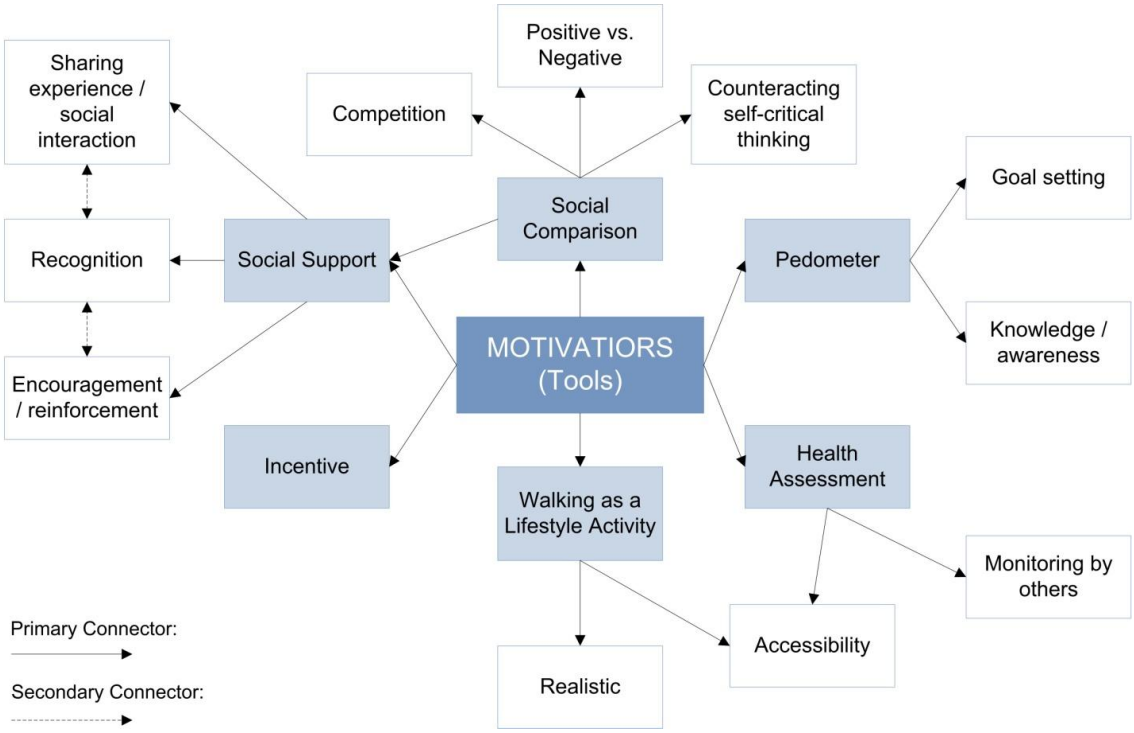

Figure 32. *Model of the 'motivators' master theme and associated sub-themes*

There were several components of the WTB intervention that participants identified as being motivating factors. Several intrinsic motivating factors were identified, such as enjoyment, sense of achievement and exercise self-efficacy. Examples of extrinsic motivating factors included the pedometer, aspects of the health assessment, accessibility, the financial incentive and the support received as part of the project. The model presented in Figure 32 illustrates the motivating factors and the associated connections between master-themes and sub-themes developed from the data. The following section presents information relating to each of the identified motivating factors.

The Pedometer: ***'It was a driving force to somehow make you keep walking'***

When discussing the participants' uses of the pedometer a number of topics arose. For 21 participants the pedometer was a mechanism for self-monitoring, awareness and goal

setting in the maintenance of new and already established physical activity. The pedometer acted as a motivator for several participants;

"Oh yeah, you can kinda keep an eye on, you know, get up from your desk and having a walk about or you know going up and down the stairs and you look how many you have done now. I mean I went to Rome while I was away and I think on one of the days I did over 20,000 steps so I thought god, that's really good and you can actually see how much you've done and you say to yourself try and do that again tomorrow".

Sarah (4; 98-102)

The majority of participants stated that they found the pedometer to be a useful monitoring tool. For example, in response to the question of whether the participant's level of physical activity had changed over the course of the WTB project Georgia stated;

"It did yeah, definitely, I think the step counter had a lot to do with it"

Georgia (3; 77)

The following extract illustrates that some participants, initially, did not value the use of the pedometer, over time most participants interviewed found them useful in helping them to stay motivated;

"..I think to myself that I must try and do more and I think it sort of motivates you when you look at your chart and you think I could've done more really couldn't I if I'd of thought about it and I'd of put some more effort into it and I think that just spurs you on then doesn't it".

Helen (2; 50-53)

The pedometer also provided a way of gaining knowledge and awareness of an individual's actual level of daily physical activity, which in itself acted as a motivator for physical activity and helped in modifying their exercise behaviours. The following quote from Joanne highlights this point;

"...Obviously the pedometer, you think ooh I'll put that on today and its make you feel like oohh [good] I've done so many steps today, because you don't really realise how many you do really".

Joanne (3; 74-76)

When talking about the pedometer Gurdeep highlighted the fact that it was something that was simple to use which gave a tangible reading to monitor your activity levels;

*"...It's something you can see isn't it, you know, **very simple** and well it is very simple but it's so effective sort of thing".*

Gurdeep (4; 91-92)

Another role of the pedometer was in the setting of goals and targets. The pedometer enabled participants to set themselves a goal or target for a particular time frame, whether it was for a specific day or on average over a specific time period. It allowed participants to keep a record of their goals and progress towards them;

*"...Because you try and **beat** the number of steps that you'd done the day before, you know".*

Joanne (5; 123)

For some participants, using the pedometer became part of their daily routine to continually monitor their behaviour over a period of time. Julia illustrated this point in the following quote;

"...And now it is part of me, I don't not put my ped on. It's just for my own benefit. I'm still keeping a score every day, at the end of the day when I take my pedometer off at night, just to sort of log and see. So on a week to week basis I can see if I've done as much this week as last week, or whatever, and that gives me an idea 'oh you need to do a bit more next week'".

Julia (10; 291-295)

Health Assessment: *'You had to come back and show someone what you had been doing'*

Obtaining Feedback: *'…some people, you know, haven't got a clue what they weigh or their blood pressure and things like that'*

One of the most commonly cited motivators was the health assessment. Many participants suggested that having their body weight, blood pressure and other health related measures taken by a trained assessor, helped to sustain their motivation throughout the intervention period. The monitoring of behaviour by others was therefore an important motivator;

"I mean I've lost some weight and I've walked more and my blood pressure's come down, my BMI, like, he [the health assessor] says everything has come down and I've met my goals in every area and I want to continue doing it now because it's given me the incentive that I need".

Maria (3; 89-92)

In addition, Helen highlighted her perception of the health assessment and how it served as a motivator due to the presence of an individual who would be monitoring her behaviour;

"I mean knowing that you've got to come back and see someone and get yourself checked again you know, you've got to do something and show what you've done".

Helen (8; 215-216)

In relation to this another motivating factor was to return to the health assessments and find out, objectively, any changes in health status. For example, in the following quote Julia illustrated the desire to discover whether her estimation of improvement is matched by objective measurements taken in the health assessment;

"To me [the best thing about the project], I think coming back to find out how you'd got on because yes, you sort of gleaned roughly from the figure [steps] what you were doing each week but that still didn't tell you, unless someone measured these things, whether it had actually had an effect. And to sort of say, well your waist-hip ratio, your blood pressure, yes, you knew whether you'd been going in the right direction'.

Julia (12; 362-366)

The intrinsic factor of enjoyment from attending the health assessments and subsequent achievement were also identified as motivating influences;

"...Because I quite enjoyed it and I do feel better for it an I was looking forward to coming back just to see how I'd progressed in that time".

Lauren (12; 319-320)

Accessibility: *'It [the health assessment] was very friendly and easy and accessible'*

The accessibility of the health assessment was also highlighted as a positive factor in qualitative discussions. The ability to attend a health assessment without having to attend a hospital or clinic setting was an important component of the WTB project.

Participants frequently mentioned that the health assessment provided an opportunity to have a health check in a less formal, more interactive and more accessible setting than visiting their local general practitioner, for instance, Margaret stated;

"So this was good 'cos people can just get checked out you know, without going to the doctors".

Margaret (8; 213-214)

Similarly, Paul reported that the health assessment was *'in a very convenient location, the time suited, it was tailored to me really' (11; 333-334).* The health assessment was therefore very accessible for this individual and was highlighted as a positive aspect of the intervention.

The Incentive: *'It makes people think that you've got something to achieve from it'*

In relation to ongoing motivation there were several perceptions held in relation to the presence of the financial incentive. For some participants the presence of a reward was a motivating factor;

"...And I think whatever you get at the end of it [reward] I think it encourages you to do it any way".

Pat (25; 677)

Other participants suggested that it was a *'goal to aim for'*, it provided something to achieve in addition to health benefits. Participants related the reward to effort as the existence of a reward encouraged participants to put more effort into increasing their levels of physical activity than they otherwise would;

"...But then again some people just won't be bothered to make the effort to do anything unless they're gonna [get the reward], I mean they're getting the benefit for their health but then again I mean we're not talking about vast amounts of money".

Helen (12; 310-312)

For others, the financial incentive was a reward for completing the practical aspects of the project rather than a reward for improving their health. For instance, Sarah states that the reward made her more likely to take part in the project;

"...You know it's time out of your day to come and do it and erm it is a bit of a chore

having to right down the steps every night and remembering to put the stepper on and you know those types of things so it is, I think it...Well, although I didn't find it a hassle as such, I just think that if the incentive wasn't there to do it I probably wouldn't have been as likely to do it".

Sarah (2; 51-55)

Long Term Impact of Incentive: *'I'd still do it even if I couldn't get a voucher at the end of it. I mean it's your health isn't it, you know mentally and taking part'*

In the longer term, participants who went on to complete a 6-month follow-up demonstrated that the reward was not a primary factor in their decision to continue to take part in the WTB project. Evidence for this is provided through their decision to continue with the project without the possibility of achieving an extrinsic reward.

Looking back, Julia's perception of the reward was that it was *'overly generous to be quite frank' (9; 57)*. Her primary motivation for taking part in the project was not for the reward and therefore her opinion was that the value of the incentive was too high. She did, however, recognise that the absence of the financial incentive may have meant that some individuals may not have taken part;

"I mean, I didn't do it for the reward. Yes, I understand that some people might need that [the incentive] as a bit of a push to do it but I genuinely wanted to do it from the start to prove myself over a period of 6 months, 12 months, whatever [...] it just depends on the people, some people need a bit more of an incentive to do it. You know, if you'd have said to me there's no incentive, I would still have taken up the challenge".

Julia (9; 257-268)

Here she distinguishes between her own motivation for taking part in the intervention and the motivation of others. Patricia also highlighted this point;

"I mean probably some wouldn't even do it if they didn't get a voucher, so you can see that some do give up and have only done it for that reason [the voucher]. Whereas some people will think well, you're trying to help me do something that I wouldn't normally do which is of benefit to us, because it's your health isn't it".

Patricia (6; 175-179)

Patricia had already stated that *'I'd still do it even if I couldn't get a voucher' (5; 150)* and therefore differentiated between her own motivation and that of others.

Support: *'I've got three daughters and they all encourage me'*

Encouragement and Reinforcement (...from significant others and peers) *'I wouldn't do it sometimes if it wasn't for Maureen'*

The need for support from significant others was reported as an important factor for the majority of participants. This need was more frequently expressed by women who said that support regarding childcare and housework was an enabling factor for physical activity. They also felt that a positive attitude towards activity on the part of spouses, children and significant others was supportive. This point is illustrated in the following quote by Maria;

"...It was, like, really good, because we [Maria and husband] do, like, quite a few things together and this was something else we could do and that was really good".

Maria (7; 177-178)

Participants also highlighted support from peers when taking part within a group setting, for example;

"...you feel better in yourself because you're taking part in something, and 'cos I got involved through the group I go to, there was a lot of support from other people who were doing it too, it makes you make friends. Otherwise, like, it's like you're on your own".

Patricia (3; 75-78)

Here, Patricia talks about taking part in the WTB project through attendance at her women's group. She talks about how the intervention 'makes you make friends'. The social support networks offered by participating in this intervention in a group setting were highlighted as adding value to physical activity as a form of activity. Recognition of achievement by peers and significant others was also an emerging theme under the heading of support. This is illustrated in the quote produced by Diane;

"Oh I've seen a big difference in you Pat".

Diane (23; 640)

The fact that others could see how an individual had improved over the course of the WTB intervention provided support and encouragement.

Counteracting Self Critical Thinking: *'I'm paranoid but he [health assessor] says my measurements are good'*

Support from the health assessor and significant others also served an additional function in counteracting self-critical thinking on the part of the WTB participant. For example, the extract from Helen below highlighted the role of the health assessor in aiming to improve her self-esteem;

"...Since I had my daughter, I had, I put on a lot of weight which most people do and I felt as if I was like, you know, overweight and you know, I needed to do something about it but I mean according to what Dan's [health assessor] told me there's nothing wrong with my measurements and there's nothing wrong with me but that still doesn't stop me thinking that there is something wrong with myself but you know I think I'll have to deal with that myself".

Helen (3; 61-66)

Again, Susan's husband had a role in supporting her participation in the WTB intervention and in attempting to increase her self-esteem;

"I mean I've got it [support] from my husband as well I mean as you know I'm paranoid and he'll say there's nothing wrong with you but I just wanna be like how I used to be, well obviously not exactly because I'm older and err, as long as I can tone down I'll be fine, you know. But I think mine is the diet I think.

Susan (6; 164-167)

Sharing Experience and Social Interaction: *'It's better to do things together'*

Participants identified that sharing the WTB experience and the social interaction that occurred as a result of their participation were motivating factors. Most participants reported that they enjoyed company when taking part in an activity and, as such, liked to plan activities with others. For example, walking with friends and neighbours was viewed as motivating. Women, more than men, stated that they often walked in groups with friends and/or family, and this served as support and encouragement to take part in physical activity. Pat and Sharon highlighted the importance of sharing experiences and exercising with others in the following quotes;

"I think if you was like, 'cos if you're doing it in two's I think you're more able to get up and do it every day like, you know knock on each other's door and go round the park together. But I think if you were probably doing it as a one person by themselves, like erm, I found like when I was on me own and walking about by me self I really didn't like

that so much it was walking with someone else and talking".

Pat (4; 104-108)

This quote provided by Pat, highlights the motivating aspects of exercising with others, in this case Pat and Sharon relied on each other to engage in physical activity together which, for them, made it more likely that the activity would be undertaken. In addition, Pat refers to the social aspect of exercising with others and the fact that this is enjoyable compared to exercising alone. This is also linked to the issue of safety, which is raised by Sharon in the quote below;

"...It can be scary so I do think you need somebody else with you and I think it gives you more confidence to do it together because you can sort of say well you know, I'm gonna get my walks in today".

Sharon (5/6; 167-168)

Walking as a form of activity allowed social interaction with other members of the community. Simply walking outside in the community where participants could meet people and keep in touch with other individuals enhanced the social benefits for some individuals;

"I tell you when you go out, when you go in the car, you don't see people you don't get to stand and talk to people. It's lovely when you walk, you meet people, you notice things what in the car you don't notice, it's just getting from A to B, it's lovely".

Susan (7; 175-177)

Again, this is highlighted by Julia who encouraged her husband and friends to walk to places rather than use the car. In the passage of text below, Julia describes how she 'sold' the benefits of walking to her husband and his 'football friends';

"I said to them, while you're doing it [walking], you're having a natter and you're bonding and all of this and they said, yeah, well it's more sociable because if you're in the car you're there in two seconds flat and you haven't really said anything but because it's a 15-20 minute walk they start nattering about whatever and they said it was more sociable and they found that, you know, they discuss more and talk about things".

Julia (8; 202-207)

This demonstrates that the benefits gained from the WTB intervention can be shared with others and used to encourage other individuals to take part in physical activity.

Competition: *'I'm not having him beating me'*

Support was also provided in the form of competition and this served as a motivating factor for some participants. Competition between friends and family added an element of fun and enjoyment. This is demonstrated by Maria;

"...Plus like my husband done it with me and like he's got a shorter stride to me and I was like I'm not having him beating me".

Maria (6; 160-161)

The WTB project also had an element of competition attached to the intervention. All participants had a collective goal of walking the distance to Beijing before the Olympics began in 2008. In addition, the six towns of Sandwell; Oldbury, Rowley Regis, Smethwick, Tipton, Wednesbury and West Bromwich, would compete with each other to determine which area contributed the most to the collective distance walked to Beijing. The quote provided by Julia below highlights how this influenced her participation and motivation in the intervention;

"I would hope a lot of people are taking the challenge up. I mean, I don't know whether there are and I know when I decided to do it in the Tipton area, there weren't many in Tipton apparently that had signed up to do it...so I'll fly the flag for Tipton!"

Julia (7-8; 218-220)

This element of competition added to a sense of fun and enjoyment. This friendly competition between the six towns of Sandwell also promoted a sense of belonging to their community.

Accessibility of walking (...as a form of physical activity): *'Walking is something that everyone can do'*

Another motivating factor was the type of activity being promoted in the WTB project. Walking was considered versatile, easy to perform and suitable for all age groups. It was also seen as a way of benefiting from being outdoors, taking in fresh air and was regarded as a lifestyle activity. Walking was also noted as an activity with little

associated cost and therefore an accessible activity for all individuals. This view was shared by Sharon and Helen as illustrated in the following quotes;

"Yeah you know and this is all free really innit, you know it doesn't cost anything to go walking".

Sharon (22; 590)

Here, Sharon, discusses financial cost (or lack of) associated with walking and therefore the accessibility of walking, as a lifestyle activity is not reliant on the ability to pay. This is a positive aspect of promoting walking as a form of lifestyle activity. In the quote below, Helen extends this further to illustrate that you do not need access to specialist equipment or facilities in order to engage in walking;

"It's easy isn't it, I mean you don't have to go anywhere special to do it, you don't have to pay anything, you know, just as long as you've got a pair of shoes".

Helen (5; 137-138)

In response to whether the participant had experienced any barriers Maria responded:

"No because, like, walking and stuff like that, you do that anyway, you know what I mean…so I just have to fit it in and work it around everything else".

Maria (5; 130, 138)

Walking as a Lifestyle Activity: *'You have to fit exercise into your life, you won't keep it up otherwise'*

The promotion of walking as a lifestyle activity was viewed positively by those taking part in the WTB project. Participants seemed to value walking as a form of exercise. The promotion of walking was a main factor in the decision of some participants to take part in the project, as illustrated by Des below;

"...There are lots of projects out there you know, but I wouldn't have done any of the other projects like cycling, you know. I wouldn't have gone on any of those because I don't feel like I would have been able to do it really, either time wise or anything else...I think it is a good idea because, you know, walking can fit into my life rather than trying to fit my life around trying to be active".

Des (10; 268-272)

Here, Des highlights the benefits of walking as a lifestyle activity in order to overcome issues relating to the barrier of time. Lower-intensity lifestyle activities, such as walking, can readily fit into a daily routine incorporating multiple bouts of physical activity to achieve daily goals rather than concentrating and committing a large portion time to a single bout of physical activity. Helen, in the quote below, expands the discussion around commitment to physical activity, as walking as a lifestyle activity, negates the need to commit large amounts of time to engage in physical activity.

"...I thought it [WTB] was a good way of me like sort of doing some exercise without having to make a commitment apart from to say to myself you must get up off your chair and walk about, you must try and get out and you must do more".

Helen (2; 30-33)

Similarly, Michael felt positive about the message to use walking as a form of lifestyle activity and this is demonstrated in the quote below;

"...I think it's [walking] a very positive thing and what I like about it is that it's not necessarily making you do things that are totally different from what you would do normally, like going to the gym or playing hockey or something like that. It is trying to think of how you can do your normal thing, your normal life in a slightly different way".

Michael (5; 129-130)

As stated previously, walking was valued by a number of participants and was identified as something that was suitable for all ages and all groups of people. Walking was viewed in a positive manner as participants suggested that it is an activity that you could fit into daily life rather than having to commit a particular period of time to exercising. For individuals with a busy lifestyle it was easier to incorporate walking into their daily routine rather than finding time to go to the gym, for example;

"...Walking is something that everybody can do and you can just fit it into your daily life and I definitely think that people need to become more active".

Lauren (18; 480-482)

Activity Related Self-Efficacy: *'It's all about confidence'*

Exercise self-efficacy is the degree of confidence an individual has in his/her ability to be physically active under a number of specific/different circumstances, or in other words, efficacy to overcome barriers to exercise (DuCharme & Brawley, 1995). Within

this project, the majority of participants felt confident in their own ability to incorporate physical activity into their daily lives and subsequently were motivated to take part in the WTB project. For instance, Margaret and Susan highlight their positive outlook in relation to the promotion of walking;

"...If someone tried to encourage me to go to the gym or something like that then I don't think I would have signed up in the first place".

Margaret (7; 180-181)

Walking, as a form of lifestyle activity, may be perceived as less intimidating to individuals who have either no experience or unpleasant prior experiences with physical activity. Individuals may therefore, be more confident in their ability to take part in an intervention that promoted this kind of activity. In addition, walking does not require individuals to enter unfamiliar settings, such as a gym, which may be a barrier to participation.

Inclusive Activity: *'I know my limitations and I know I'm capable of doing this exercise [walking]'*

For participants who experienced barriers relating to health limitations, walking provided an activity that an individual could realistically participate in. It was an activity that could be tailored in relation to frequency, intensity and duration and therefore could take into account the current fitness level and health status of the individual. This is illustrated by Susan;

"You know my way of thinking is that doing some is better than doing none, you know, it is difficult. You know it didn't really mean that much to me because I knew I wouldn't be able to it regularly [due to ill health]. You know, I thought ten thousand, if I can't do it then I can't do it, simple as that, I done what I could do and on one day it was probably only 859 [laughing] and I still wrote it down".

Susan (3; 68-72)

To summarise, walking as a form of lifestyle activity was reported to be an accessible and realistic activity that individuals undertaking the WTB intervention could participate in regardless of age, gender, health status and financial status. Julia captures this point in the quote below;

"So, I think the whole object[ive] of this [intervention], which I feel I've proved, is that

any sort of exercise, just walking or doing a bit of line dancing or some sort of classes that you enjoy or gardening, anything that is within your ability will help the cause and I think that's the point that needs to get across. You don't have to go to the gym to get that bit of exercise and to get on the right track to getting healthy really".

Julia (5; 140-145)

3. Outcomes: *'I feel better for it...physically and mentally'*

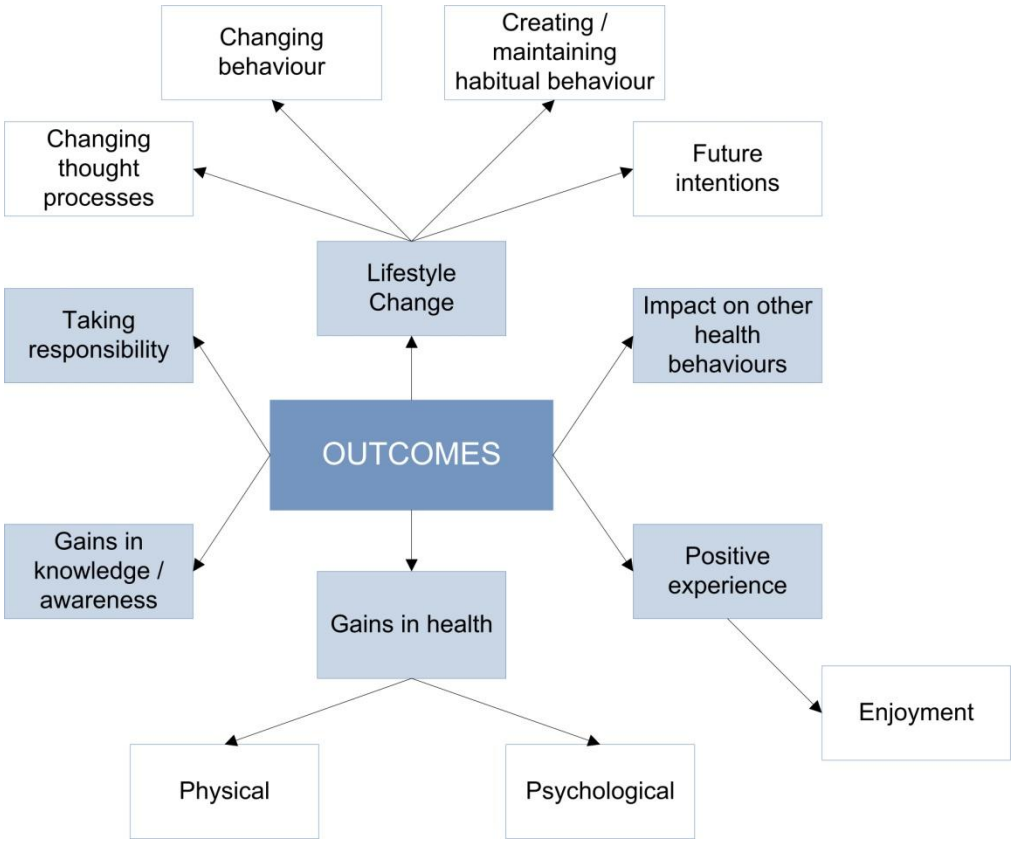

Figure 33 *Model of the 'outcomes' master theme and associated sub-themes*

Qualitative discussions revealed the notion of positive outcomes as a central theme. The model presented in Figure 33 illustrates the master-themes and sub-themes relating to positive outcomes. This concept is also linked to the main theme of 'initial motivation' as this contributed to the distinction between projected or expected versus actual and genuine outcomes. From the outset, some participants illustrated that they were taking part in the project with the expectation of achieving positive outcomes. While, other participants, signed up for the project without any outcome related expectations. The initial beliefs held by participants in terms of outcomes were either supported or not achieved.

This master theme can be linked to the concept of decisional balance as a related construct to the TTM. Decisional balance relates to a person's perceptions of benefits compared to the negative aspects associated with changing their physical activity related behaviour (Marcus, et al., 1992a). Some individuals taking part in qualitative discussions suggested that they were more likely to recognise the pros of participating in physical activity, such as improved health, rather than considering the negative aspects of physical activity, such as having limited time.

Health: *'I feel better physically and mentally'*

When considering the benefits of physical activity, participants made a key connection with health promotion. There appeared to be a general awareness that physical activity played an important role in looking after your body and being healthy. The main benefits that people attributed to participating in the WTB project and therefore physical activity were general health and well-being, and preventing the onset of illness and disease.

"[I feel] better physically and mentally, because I think it's easy, especially this sort of time of the year, you know, with the dull days and the weather and whatever, you just sort of vegetate, you know, you can depress yourself. You can be depressed when there's nothing to be depressed about. Whereas, you know, a day like today you can just go out and have a walk, get a bit of fresh air. You've done something, it's got you out of the house, you're better for it".

Julia (8; 245-251)

This quote from Julia illustrates the physical and psychological benefits of engaging in physical activity for her.

Physical: *'I have felt a lot better. It's made me more agile'*

An example of a positive outcome, of a physical nature, was highlighted by Pat who talked about her improved mobility as a result of taking part in the WTB project;

"I've felt a lot of benefits, because before I done this project I had an appointment to have me other knee, to have another new knee and since I've been walking, I don't know whether it's all in me mind but I don't think I even need a new knee now, to be quite honest...I could hardly walk on that for months and months and I find I can walk anywhere now".

Pat (7; 189-191, 8; 199-202)

Other positive outcomes were perceived in terms of the benefit of physical activity in preventing the onset of general health issues. A number of participants stated that taking part in more physical activity through the WTB project helped to bring relief from existing health problems such as arthritis as illustrated by Pat;

"Yeah, you know, I think since I've been walking a lot more my knee's got stronger so I don't need it. This has done me the world of good to be quite honest... Because I was like a cripple to be quite honest and now I feel like I could walk anywhere to be quite honest and instead of catching buses we'll walk down to another couple of bus stops down".

Pat (24; 652-653)

Other participants described positive outcomes in terms of how they felt whilst taking part in physical activity. A number of participants stated that they were aware that their body was able to cope better with the demands of physical activity as their levels of activity increased as highlighted by Susan;

"The fresh air is good I mean, at the beginning I was really really out of breath and I started walking and it took me ages to get to the school [to pick up daughter], about half an hour, and now I go out, I used to go out at about quarter to three, 'cos I wasn't used to walking, now I go out the house at five past three and I get there in ten minutes".

Susan (7; 185-188)

Psychological Benefits and Well-being: *'I do feel better in myself'*

Participants also reported a number of psychological benefits associated with taking part in physical activity. Positive psychological outcomes were mentioned in relation to *'the feel good factor'* and improving self-esteem and confidence. The following extract from Sarah illustrates this point;

"I think that I have done a lot more walking erm because of it…But I was doing more steps because I knew I was counting them, erm and I suppose that exercise was actually better for me [than weights] and that has probably ***made me feel better****. You know, I'm not saying that it's made a massive difference to my life but yeah, it has made some difference".*

Sarah (5; 120-125)

'Feeling better in yourself' was one of the most common benefits to come forward from qualitative discussions. Taking part in physical activity was perceived to contribute to a

feeling of general well-being. For instance, in the following quote, Lauren highlights the benefits she felt through taking part in the WTB project;

"...I feel better walking places than I do driving to places, because, I dunno, I quite enjoy walking and I think, I mean, I'm in a better mood at work if I've walked than if I had sat in the car and drove there so I suppose if that's a benefit then yeah, I do feel better in myself".

Lauren (5; 125-128)

Taking part in physical activity through the WTB project was also perceived as a tool for addressing negative thought processes, as a way of relieving stress and gaining the space and time to reflect. This belief is demonstrated by Margaret;

"...I feel much better when I've gone for a long walk, you know. You've got time to yourself and have a think".

Margaret (6; 141-142)

In the following quote, Paul also identifies the link between physical health and psychological well-being;

"I spent quite a lot of time not in the peak of physical health and I found when I was very anxious and stressed out and finding it hard to cope, that one of the things that did tend to relieve the anxiety was going for a walk and getting some exercise. So, I'd already started to see the benefit".

Paul (2; 31-35)

Here, Paul highlights the use of physical activity as a coping mechanism for anxiety. Paul later goes on to say that taking part in the intervention presented several benefits including *'being able to think more clearly and less overwhelmed by anxieties' (4; 104-105).*

Knowledge and Awareness; *'...it gets physical activity into your consciousness'*

For a number of participants, a significant positive outcome was gaining knowledge about their own health state. This sub-theme is also linked to the initial motivation of some participants who suggested that the main reason for taking part in the project was to gain knowledge about their own health status. For these participants the positive outcomes gained met the expectations they held when deciding to sign up for the

project. The following quotation from Des highlights the importance of receiving regular health 'check-ups';

"...I think knowing all of the information about yourself really, erm, your blood pressure, erm, size, weight, you know, I mean I haven't been to the doctors for years and like I said the day I came here I felt really well so it was a surprise that my blood pressure was high".

Des (9; 230-232)

Here, Lauren highlights the importance of gaining knowledge and awareness relating to health status in addition to using this knowledge as a means to assessing changes over time;

"...It was really interesting actually to see, because you obviously don't know your hip to waist ratio, you wouldn't measure yourself normally at home, I mean you weigh yourself on the scales but everything else you don't normally check a home or your blood pressure so I was quite interested to see that and see how it had improved so that was really good".

Lauren (6; 164-168)

For other participants it went beyond gaining knowledge and awareness about their own health state. It also involved taking responsibility for their own health status, as illustrated by Julia;

"...It's being aware of what they're doing and taking responsibility really, no one else is going to do it for them....If you can think, well, at least I can feel as if I've done as much as I can and I can't say that 100% because there's still room for improvement as I say but if you feel like you've done things to help in that direction if then they turn around and yes, but unfortunately you are suffering from this, that and the other. At least you feel you've done your bit you couldn't have done any more could you, where as you'd be the 'what if's' then".

Julia (12; 327-335)

Participants also highlighted the increase in knowledge and awareness in relation to other forms of physical activity that is carried out in daily life. For example, Trevor states;

"So, I became more aware of my other physical activities during the day and monitoring that...so you could see it's not all about just the walking, it's about your

general physical activities, whether it is, you know, people get obsessed with exercise, that exercise is deemed to be treadmill, rowing machine, whatever, not the general physicality of normal everyday life like carrying a child to school, playing in the park, all those kinds of things, I thought well, that's all activity".

Trevor (8; 226-227, 234-239)

Positive Experience: '*It's not a chore, it's an enjoyment*'

Many participants regarded fun and enjoyment as major benefits of taking part in the WTB project. A positive experience was cited by a number of participants. Participant's beliefs seemed to suggest a 'wanting' to participate in physical activity rather than perceiving it as a 'chore' and that they looked forward to their next bout of physical activity. Pat illustrates this view in the following quote;

"I mean I used to stay in bed every morning since I retired and now I can't wait to get up and walk round around the park".

Pat (18; 489-490)

Lauren also highlights positive outcomes related to taking part in the intervention, finding something that was enjoyable and becoming aware of how you can take part in physical activity as a lifestyle activity and not necessarily realise that you are exercising.

"...It was quite interesting to see how much you can do without realising it. You don't even know, it wasn't like a chore or anything to do the steps I was just doing something I enjoyed and I managed to like, clock up quite a few steps".

Lauren (4; 84-87)

Experiencing a sense of achievement was also described by many of the participants. This achievement acted as a motivator in continuing physical activity. If participants perceived an improvement then they seemed more likely to continue taking part in physical activity into the future. For example, Susan expresses her improvement in physical fitness and her attitude towards taking part in 'power walking';

"For me, it got easier the walking, because right at the beginning to walk from here to there [pointing to other side of room] then I'd be out of breath and now I can get to school in 10 minutes, it's brilliant, it really is good, yeah, 'cos I was walking really slow before and now it's just power walking. ***I just love it".***

Susan (8; 208-210)

Impact on other Health Behaviours: *'You educate yourself to think, "well I'll walk there instead of going in the car"'*

In addition to the physiological and psychological health gains a number of individuals stated that taking part in the WTB project had an impact on health behaviours other than physical activity. This is highlighted by Julia who discusses how her diet has changed since taking part in the project. Here, Julia talks about trying to achieve a balance in relation to her diet and being proactive in reducing the amount of 'unhealthy' foods in her diet;

"I think when you're coming up to the health assessment, it's not so much the exercise, but the actual diet as well, and you try to be healthier. I mean I would be lying if I was on a 'healthy diet' but I would like to think that it is ***healthier than it was before****, you know, you try and do your vegetables, your five a day, err, fruit, yes we all have the* ***wrong things****, crisps and cake, but I don't have it every day. It's a treat perhaps at weekends, or moderation you know. Whereas before, it was just the done thing that it went in the trolley every week. Well, it doesn't know, you know, you sort of try and, when I'm sort of planning meals 'cos I cook most nights or whatever, you know, I try and* ***balance it****. If we have chips, perhaps once a week, if that, whereas before it was like, well it's the quickest thing we'd have it every other night. We don't do that now".*

Julia (9; 231-238)

Lifestyle Behaviour Change: *'I think consciously I do try and do more'*

In terms of level of physical activity as an outcome of the WTB project participants suggested that they were situated at various points along the behaviour change continuum. By linking this theme of 'lifestyle change' to the Transtheoretical Model of Behaviour Change (Section 2.4.1), participants could be identified as employing a number of the processes of change as recognised by Prochaska and DiClemente (1982).

Changing Thought Processes *'It's stupid, you don't need the car, just, you know, leg it!'*

Some individuals illustrated that by taking part in the WTB project they were more likely to think about carrying out positive health behaviours. Changing thought processes was a common emerging theme from the qualitative discussions. Participants provided evidence for the use of 'consciousness raising', 'self re-evaluation' and 'stimulus control' as processes in changing behaviour.

Consciousness raising involves finding and learning new facts, ideas and tips that support participation in physical activity. In this instance participants illustrated that they were consciously aware of the causes and consequences of not participating in physical activity and as a result began to think about incorporating different tips and ideas of how to increase their levels of daily lifestyle physical activity. Des and Margaret illustrate the use of consciousness raising;

"I mean you're more likely to think, oh I'll walk these stairs instead of taking the lift"
Des (6; 155-156)

"...I think we do use the car less now and walk more, you know when you've just got to pop to the shops I'll think about walking now instead of automatically getting in the car".
Margaret (5; 127-128)

The use of self re-evaluation and stimulus control processes towards behaviour change is illustrated in the extract from Lauren below. The process of self re-evaluation combines both cognitive and affective assessments of one's self image with and without a particular behaviour. Here Lauren demonstrates her cognitive and affective assessments of her own self-image in terms of being 'ashamed' of the fact that she used the car unnecessarily. In addition, the process of stimulus control is demonstrated in Lauren's use of the pedometer as a prompt for carrying out healthier alternatives;

"...To me the main thing was to make me walk to work, like I said, because I was ashamed of the fact that I drove, and I do drive everywhere, if I go to the shop up the road I do drive, whereas now I don't, I actually get my pedometer on and I'll actually think I've got to walk and I need to count some steps".
Lauren (6; 146-149)

Changing Behaviour: *'You know, we do use the car less now and walk more'*

Progressing from changes in thought processes to a change in behaviour, participants discussed a number of examples of the use of experiential and behavioural processes to aid this progression. For example, here, Des and Maria illustrate the use of counter conditioning which employs the use of healthy behaviours that can substitute less healthy behaviours;

"I think consciously I do try and do more. Whereas, I probably used to go more places

in the car I either don't go in the car or park the car where I've got to walk a bit further. And things like lifts, you go shopping and you can jump in the lift but now I go up the stairs. I don't even think of the lift now whereas before I'd never think to take the stairs. So it's silly little thing but, you know, and I'll think come on up the stairs and you find yourself saying that, whereas before I'd of been the first one to say I'm not going up the stairs. You know, so it's silly little things like that".

Julia (8: 216-222)

Again, Gurdeep demonstrates the use of the pedometer as a method of stimulus control – adding a prompt for carrying out physical activity as a healthy behaviour;

"…I would say that it [activity level] has increased actually, on more of a basis, where as sometimes I wouldn't bother probably walking I will walk more and like I say the pedometer has got a lot to do with that".

Gurdeep (6; 152-154)

In addition, some participants provided examples of moving from one stage of the TTM of behaviour change (Prochaska & DiClemente, 1983) to the next as a result of taking part in the intervention. Michael illustrates this in his quote below;

"It didn't change my attitude to health in general but it may have tipped the balance to me actually doing it".

Michael (11; 336-337)

Creating and / or Maintaining Habitual Behaviour: *'I guess in that three month period [of intervention] you develop a good habit and it becomes part of your routine'.*

Some participants demonstrated the creation and/or maintenance of habitual behaviour. The following quote highlights Des' experience of creating habitual behaviour;

"...Some mornings there are other things to do and you think oh I'll do it tomorrow. But once you get into it, if you can keep into it, it's fine. You see an improvement".

Des (5; 138-140)

Similarly, Paul, in the quote below, highlights that taking parting in the WTB intervention can develop habitual behaviour;

"I guess in that three-month [intervention] period you develop good habits and it becomes part of your routine, then it will continue".

Paul (9; 281-282)

In addition, participants utilised several processes of change in order to achieve the goal of creating and/or maintaining habitual behaviours. Here, Pat demonstrates the use of consciousness raising and stimulus control in creating habitual behaviour. Pat highlights her application of ideas and tips that support her in participating in physical activity. In addition, for Pat the adverts that are broadcasted on the TV act as a cue or prompt to carry out physical activity throughout an evening. She also highlights that her participation in physical activity has become a form of habitual behaviour;

"What I do, though, you know when the ads [adverts] come on the telly, cos like, you come out of my living room and I've got quite a long hall, I just walk from the hall down round the living room and back round and I do that till the program comes back on... and when I get up of a morning I do it as well before I walk around the park. I've just got this thing now, where I get out of bed and I've gotta walk".

Pat (14; 366-370)

Lauren illustrates the use of self re-evaluation as a process of creating and or maintaining behaviour change. As previously described self re-evaluation involves cognitive and affective assessment of an individual's self image. In the extract provided below, for Lauren, being physically inactive creates feelings of guilt and this negative affect provides motivation to continue to take part in physical activity;

"I've sort of got myself into a mindset now where I feel guilty now if I don't do something."

Lauren (10; 267)

Future Intentions: *'I'm going to carry on the good work'*

When discussing the participant's future intentions in terms of physical activity, a large number of individuals stated that they were confident in their ability to continue with the physical activity levels established and in some cases increase their levels of physical activity. A number of participants highlighted 'the need to do more' in the future, as illustrated by Georgia;

"I liked doing it, I'll carry on counting my steps, but I need to do a bit more, I need to go swimming and things like that".

Georgia (13; 344-345)

For other participants, taking part in the WTB project provided the 'incentive' that they needed in order to initialise a healthier lifestyle by increasing their levels of physical activity. For instance, Maria stated;

"…I've lost some weight and I've walked more and my blood pressures come down, my BMI, like, he [health assessor] says everything's come down and I've met my goals in every area and I want to continue doing it now because it's given me the incentive that I needed…It's like, now I've seen the results, clothes are fitting me better and so your thinking I need to lose a little bit more weight…like I said over five years, erm, I've put two stone on so I wanna get back to what I used to be and this has been like a kick-up the arse to get going again".

Maria (4; 109-111, 6; 147-150)

The extract from Sarah below, illustrates her feelings towards the future in terms of leading a healthier lifestyle and her desire not to revert back to her previous levels of activity before taking part in the WTB project;

"I think I may have done more over the last few weeks, well say the last 12 weeks, because I knew I was doing this, so it was an incentive to do more exercise, so hopefully I won't get back to what I was before".

Sarah (6; 142-144)

When asked about the future in the absence of the reward Margaret stated;

"I think I'd like to see if I have lost anymore, you know, whether I can do it for myself".

Margaret 3.12 (5; 112)

Here Margaret highlights her desire to discover whether her weight loss could be maintained without the presence of an extrinsic reward.

Taking Responsibility for your own Health: *'It's really got to be down to you'*

Within the theme of 'lifestyle change' an important emerging sub-theme was that of taking responsibility for your own health state. The WTB project was viewed positively as a vehicle for taking responsibility for the participants' own health state, as demonstrated by Georgia;

"I do think we all do need to lose some weight and look after our own health and this [the project] is a good thing".

Georgia (14; 383-384)

Helen illustrates the importance of taking responsibility for your own health and also individuals need to take an active role in motivating themselves to engage in physical activity;

"...But I mean for me I, you know brisk walking, anyone can really do it can't they if they put their mind to it, but it's whether they want to do it. That's what it all comes down to".

Helen (7; 181-182)

According to Helen, it is the desire, drive and motivation of the individual that will ultimately change their behaviour.

4. Barriers: ***'It's just hard sometimes to fit it in'***

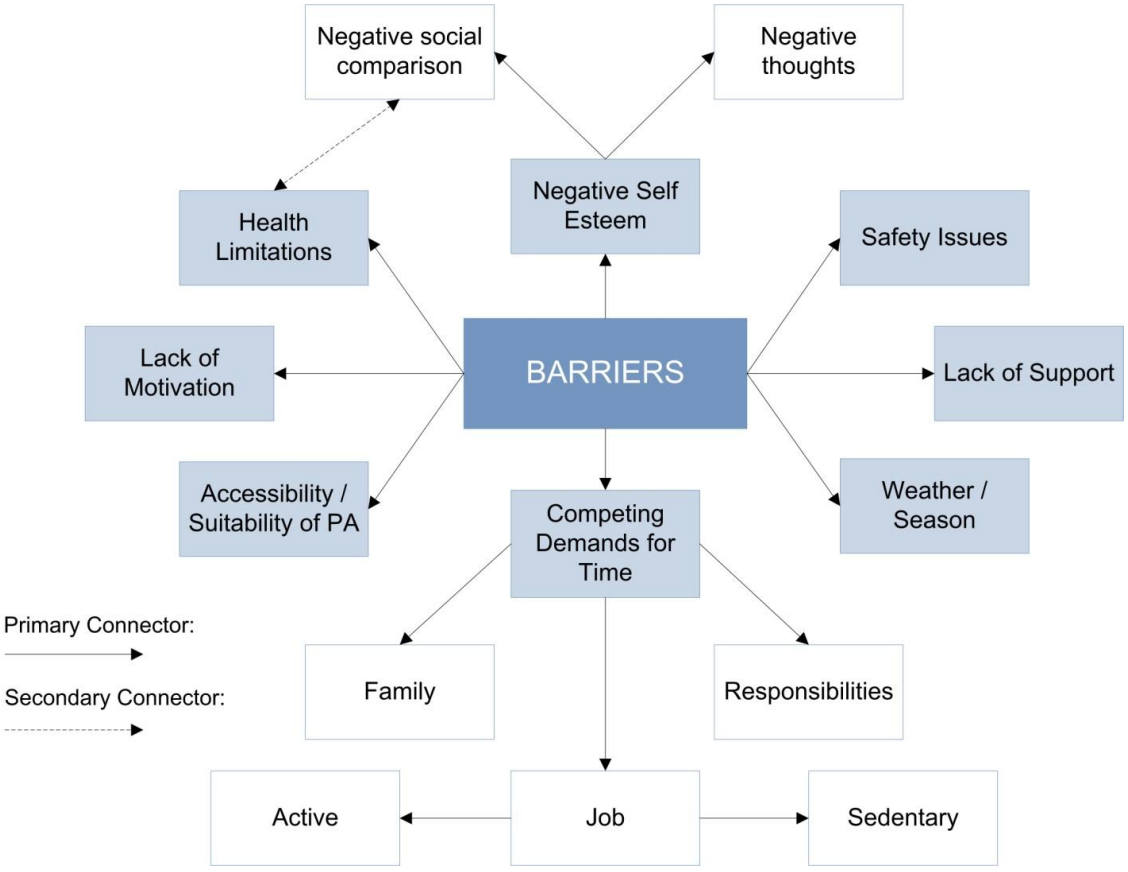

Figure 34. *Model of the 'barriers' master theme and associated sub-themes*

Figure 34 illustrates the barriers to participation in physical activity. Perceived barriers to taking part in physical activity varied from personal factors to environmental and

practical factors. Some individuals identified barriers that were perceived and those that were actual and genuine, for example, Georgia stated;

"I mean, I bet a lot of people say that they haven't got time, but I don't think it's an excuse, I think that is, you know, when you're at work and by the time you've got home and done tea and probably this time of year as well, I might have done probably more walking in the summer of an evening than I would do now".

Georgia (8; 207-211)

Environmental and Practical Barriers: *'I mean some people won't have time to do that many [steps]'*

In relation to environmental and practical barriers, participants often cited that a busy lifestyle and varying responsibilities were the main factors impacting upon their participation in physical activity.

The combination of work and **family responsibilities** were major contributing factors to a **lack of time** for physical activity. The responsibilities associated with having children were frequently reported as a barrier to physical activity as this involved organising and taking care of their needs and as a result some respondents felt restricted in the amount of time that they had and how they could use it;

"...Maybe it's more difficult with the kids, you know, they always need something doing and sometimes you just haven't got the time. And in the cold days you don't wanna take the kids out with ya, cos it takes an hour to get them wrapped up and ready. So just kinda things like that you know can stop ya".

Margaret (6; 148-151)

Time constraints are frequent barriers to physical activity participation (Sherwood & Jeffery, 2000) and this was reported during this process evaluation. When time was available, participants stated that there were competing demands for its use and that they were either 'too tired' or lacked the motivation to expend more energy engaging in physical activity, as highlighted by Sarah;

"Just, mainly time, like I said I work for the PCT and it's been very, very busy so just that really. Its time more than anything else and pressures from work really and at the end of the day, it's gone dark outside and you don't want to go to the gym you just want to go home and curl up with a stew".

Sarah (6; 152-154)

In addition to a lack of time due to the demands of their employment, a number of participants identified that the pressures of work and the actual type of work being undertaken were significant barriers to increasing their physical activity levels. Joanne illustrates this in the following extract;

"...being stuck at my computer all day really. Yeah, because obviously like, sitting down mostly, you know because that's like my job so it is hard to sort of, you know, once I'm doing something I'm engrossed in doing it and I don't think about you know going away [from my desk] to have a break or anything like".

Joanne (5; 132-135)

Joanne's sedentary employment role presented a significant barrier to engaging in physical activity throughout the working day, making it hard for her to take part in walking as a lifestyle activity. To add to this, Helen described differences between the availability of time to carry out physical activity during the week and at weekends;

"I mean it's easier of a weekend 'cos I like go out shopping and go somewhere and I do loads of walking so of a weekend it really wasn't that much of an issue for me it was just like in the day time that I struggled because sometimes if I was like sort of on my own all day it was like sort of difficult to move away from the desk because the phone keeps ringing but I mean consciously I had it in the back of my mind I must get up, I must walk, I must do this".

Helen (2; 33-37)

Weather / Season: *'Now the weather is better, I like having a little waddle'*

The cold weather was also cited as a reason for preventing people from participating in physical activity, particularly during the autumn and winter. The idea of going out in the cold to exercise was de-motivating for some participants and this was shown in a change in the participant's level of physical activity. Des highlights the influence of the weather in his participation;

"...I think with my three months [intervention period] being over the winter, its [my activity] has slowed down a bit, compared to the summer months, you know, I think there would have been a bigger difference say if I did it in the spring or summer and you can get out and about again".

Des (7; 191-193)

The weather needs to be conducive to participation in physical activity for a number of individuals, which is consistent with the literature (Tucker & Gilliland, 2007).

Safety Issues: *'You can't go out on your own, can you, these days'*

Some participants identified issues of personal safety as a potential barrier to physical activity participation. This was particularly in relation to the use of public spaces, such as local parks. Participants, however, also described how they could overcome this barrier by exercising with others. Here, Des and Diane illustrate the importance of exercising with others due to perceived safety issues;

"I think it is better because like erm, if I was away Pat wouldn't walk round the park by herself, or vice versa, because it ain't really safe in the park where we are...By us we didn't really have anything to encourage you to do anything, like we said we've got a lovely park just on our door step but it was frightening to walk round, but now it's better 'cos you're with someone".

Diane (6; 159-160, 17; 467-469)

"...because you can't go out on your own these days, so I have to wait and my son goes out with me and we do further walks together. But you can't go to isolated spots on your own".

Des (4; 98-100)

Safety is often discussed in the literature in relation to women (Foster, Hillsdon, & Thorogood, 2004). However, both male and female participants of WTB reported similar concerns relating to personal safety and fear of attack in isolated areas.

Suitability and Accessibility of Activity: *'Oh no, they're boring'*

Another barrier that was cited by some participants was the suitability and accessibility of walking as a mode of physical activity. Existing walking related groups were considered to be unsuitable for 'our age'. This is demonstrated through the extract provided by Susan. Susan found that walking wasn't enough of a challenging activity and she states that one of the walking groups she attended was 'boring' and suggested that the group was suitable for an older age group due to the pace and route of the led walk;

"I have been on one of them and I found it quite boring because you were only walking round the streets and that where as the ramblers will probably suit me better because you're going out in the country aren't you. That's why I didn't go again because they

were just walking round the streets and erm obviously it's also 'cos of their age because they're like in their 60's, you know retired. And they're gonna walk slow, whatever, but when you're with loads of people, you can walk, do ya know what I mean, and his was just down little streets or round the park and for me it was boring".

Susan (12; 315-320)

In contrast to the unsuitability of the walking group for Susan, Helen found the idea of a walking group appealing; however, it wasn't an accessible activity for her due her working patterns. The walking group took place during times when Helen was at work and therefore, although she had the desire to take part, due to work responsibilities attendance at a walking group was not an option;

"...I remember when I started and you gave me a book on walks, local walks, I think that was a brilliant idea as well. A lot of them were in the day, which was unfortunate because I work, but I think for other people, like those who have retired anybody, can work and keep active and get fit".

Helen (18; 482-485)

Personal Barriers: *'I mean my minds ready, it's just my body won't let me do it'*

In addition to environmental and practical barriers experienced by some participants, personal barriers were also identified.

Health Limitations: *'The pain holds you back'*

The existence of health problems was identified as an important barrier to increasing levels of physical activity. The symptoms experienced by participants presented a real barrier to participation in certain activities and the frequency of physical activity that the individual could take part in. This is in comparison to the positive outcomes experienced by some participants in terms of alleviating symptoms associated with existing health problems, as demonstrated by Susan;

"I know I never went over ten [thousand] but erm it was quite good. I mean it varies from day to day because of my health problems because sometimes I can't manage so it'd be sort of about five thousand steps up to nine if I'm really feeling good".

Susan (3; 55-59)

Confidence, Self Consciousness and Negative Social Comparison: *'I'm a bit paranoid about what I weigh'*

In comparison to the aforementioned positive changes in self efficacy a lack of confidence, relating to physical activity was apparent throughout discussions. As a barrier to physical activity a lack of self-confidence was related to self-consciousness. These barriers were particularly apparent when participants discussed progressing from walking to 'more rigorous' forms of activity, such as going to the gym. A lack of confidence was associated with a fear of embarrassment, especially in front of others, for example, not being able to use the equipment without assistance. Some participants said that they felt uncomfortable in going to the gym and therefore tended to avoid such environments. Concerns were focused on the operation of equipment in front of peers. The fear of walking in alone, for the first time, was especially noted by Susan;

"But in the day I need someone to go with and I haven't got anyone to go with. I'd like to sort of join a gym and that, but I think it's a confidence thing, I just want someone to go with. I mean I'll probably be all right when I'm there and in it's just getting someone to go with me, you know...I know I want to do it but it's having the confidence to walk through on your own into the gym".

Susan (8; 219-22, 310; 256-257)

If barriers of self-confidence and self-consciousness could be overcome and participants actually visited a leisure centre facility participants expressed that an additional barrier was encountered. The gym/leisure centre instructors were perceived to be difficult to approach or else they did not appear to care, as illustrated by Pat;

"...I come one day and I went up to the gym and there was, the man who worked in the gym and the young lad were just standing there cleaning the machines and you know I don't know how to work em so I just stood there for about 5 minutes and they just ignored me so I asked one of the girls who was on the walking machines to show me how to use it. But I think when you're older they don't want to bother with you, so it's nice to think that you could do something you know, as old as we all are, that we could. Because people don't want to bother with us"

Pat (21; 570-578)

Self-consciousness was especially discussed in terms of body image, which was exacerbated through negative social comparison. The extract from Susan below illustrates this particular barrier. For Susan, the perception of her own body was a key

barrier to her going to the gym. Susan's perception of her own body is not congruent with that of significant others and support from others does not appear to influence her level of confidence;

"You know I don't wanna go in there [the gym] and they're all size 8's and you feel huge, but that's how I feel. My husband keeps telling me that I'm not but its set in there [point to head]. 'Cos I used to be a size 12 before and I'm a 16 now so that is huge from 12 isn't it?... But I've had caesareans and I probably don't look it, but I am. So, you know, it's just how I feel in myself isn't it. You know people will say oh there's nothing wrong with you and you're thinking you're just trying to be polite, I'm not blind".

Susan (10; 269-271)

Patricia's experience of negative comparison also highlights its impact of self-confidence participation in physical activity;

"Yeah, it's a big improvement and I love it, but not all the time though, because obviously when I'm in pain then I'm like an old woman and you see a 19 year old walking really much faster than you and your thinking I wish I was walking like that today but it's the pain, the pain holds you back. You know but you think hopefully the next day it'll be different and sometimes it is".

Patricia (8; 196-199)

5. Evaluation: ***'It's important to have this kind of project'***

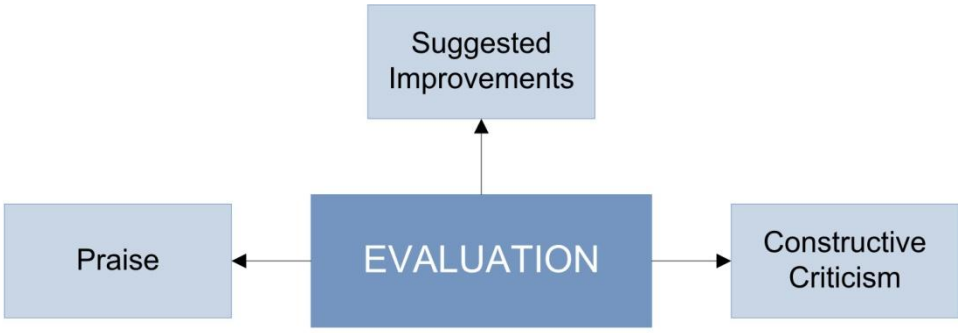

Figure 35. *Model of the 'evaluation' master theme and associated sub-themes*

The model presented in Figure 35 highlights the master-theme of evaluation and associated sub-themes that were highlighted when participants were asked to provide their views of the WTB project. Participants praised aspects of the project, provided constructive criticism and also provided suggested improvements for the future.

Praise: *'Anything that is trying to get you healthier and trying to stop you from getting things has got to be good'*

Throughout discussions the majority of participants felt that the WTB project was a worthwhile venture. Participants acknowledged that the aim of the project was to improve their health, as demonstrated by Helen;

".... I suppose what they're trying to do really is they're trying to improve the quality of people's lives and I suppose like you say, through these assessments people don't know if they've got a problem and it's helping them as well and obviously, it's having a good effect on their health and making 'em live longer and it makes them think more about what they're doing as well. You know and hopefully stopping people from getting illnesses later on, you know, because that costs a lot of money".

Helen (11; 282-287)

Again, when asked whether he thought that this kind of project was a good way to spend public money, Gurdeep responded;

"Definitely, definitely, yeah, without a doubt, yep. You know stopping you from getting something is better than trying to cure it later, you know. Absolutely"

Gurdeep (11; 295-296)

The majority of participants who identified that it was better to try and live a healthy lifestyle in order to try and prevent the occurrence of illness and disease rather than trying to cure it shared this perception. For example, Michael argued;

"If you look at the heath economics generally, you could argue, and maybe people are arguing, that if it really makes a change in behaviour it's worth £40, you know".

Michael (10; 311-212)

Constructive Criticism: *'It's got to be targeted at the right people'*

Although participants provided positive comments individuals also provided constructive criticism about various aspects of the scheme. Throughout discussions one of the most common criticisms was that the project needed to be advertised and promoted more. Some participants felt that awareness of the project was low and that there were many more people who could benefit from the project if they knew about it. They felt that a lot of promotion occurred through word of mouth with current participants trying to encourage family, friends and colleagues to sign up for the project.

Suggestions for possible mechanisms for promotion were adverts in the local newspapers and local radio;

"I think just there are areas really where people don't know about it. As I said by us we'd of never heard anything if I didn't go to that club I wouldn't have heard anything about it, you know".

Diane (19; 523-524)

A further criticism cited by a limited number of participants was the practicality of the health assessment in terms of time and location.

"I mean my husband hasn't come today, well I mean it's hard for him to get up here but erm I think he lost a bit of interest really because he knows he's got to lose some weight. I think he was probably a bit more geared up to start with, you know what I mean?"

Georgia (11; 301- 303)

Other participants identified that the project should be targeted at the right audience in order to be the best use of public funds, i.e. those who have a sedentary lifestyle. Even individuals who reported that they would have exercised even without the intervention highlighted that they could see how others could gain benefits from taking part in the project, even though they may not choose to. As Sarah says in the following quote, she felt as though she was being rewarded for something that she would have done anyway;

"I mean for some people this kind of thing would be fantastic and I can see it being, you know, a boost to get them going. Generally, I do think that it's a good project, but I think, like I say, it's got to be targeted at the right people, I think, otherwise its erm, because if, well I suppose, that you know, if someone's going to give me £50 for something I do anyway and its, you know".

Sarah (10; 269-272)

Sarah's evaluation of the WTB project highlights one particular problem of implementing the use of financial incentives. The 'inverse care law' suggests that individuals who visit GPs for screening and prevention are less likely to be in need than those who do not attend (Furler et al., 2002). In this case, the WTB intervention, as a subsidised preventive health service, may have been taken up by those who would have attended anyway, or by those who are less in need for the service. Therefore, in this case, there is an argument for incentives being inefficient. On the other hand, it may be argued that those who are sedentary and are in the precontemplation or contemplation

stages of the TTM (Prochaska & DiClemente, 1983) would benefit from the presence of an incentive. This relates to the targeting of incentive-based physical activity interventions which will be discussed in Chapter 7.

"It's a good project, although, I don't think you should expect to get a reward for it. I think it's a good project and I suppose, if you're honest, it's nice to get something at the end of it but I think it would have worked without that".

Jane (16; 485-487)

Here, Jane highlights the view that the project would have worked without the presence of an incentive. However, others share the view that some individuals would not have taken part in the intervention without the opportunity to receive a reward, which supports Sarah's *(10; 269-272)* argument that it needs to be targeted to right people.

Suggested Changes: *'Also, you're just doing it on your own, so, some more support would have been helpful'*

Participants provided a number of suggested changes, which in their opinion would improve or develop the WTB project further.

For Georgia and Gurdeep, possible improvements could be made in terms of the health assessment. For Georgia, the health assessment was an opportunity to discuss health issues in more depth and in Georgia's opinion this was a lost opportunity, which could be built upon.

"I think, like, there were opportunities there to discuss health issues and maybe more could have been made of that, it was a wasted thing really, it was discussed in enough depth I don't think".

Georgia (10; 265-266)

Gurdeep suggested possible additions to the health assessment in terms of the measures taken;

"If you wanted to go deeper, I suppose, erm, levels of sugar, cholesterol, those sorts of things yeah. That sort of thing would maybe useful".

Gurdeep (9; 245-246)

Sarah suggested the use of an online monitoring system to track progress and calculate achievements. In her opinion, an online monitoring system would have been easier for

her to keep a track of her progress and also a method for the project coordinator to assess the progress of participants;

"The only other thing, I suppose, which might be good, because, you have to go home and calculate all of your steps by hand, what you could have is something online where you could just put your steps in that way and someone calculates them for you rather than sitting at home doing it yourself. I mean I calculate all of mine just through an excel spreadsheet... you could see your progress everyday then. Basically you could just log in, and even if you do it once a week and then someone can actually track your progress."

Sarah (11; 280-285, 293-294)

Helen and Sarah's extracts below illustrate their suggestions for improvements, which centre on the positive use of social comparison throughout the intervention period. This suggestion involves the use of peers for support and sharing experience. They felt that structured contact with others who were taking part in the project would 'give you a bit extra motivation'. Interacting with individuals who may be in the same position in terms of levels of motivation would, in their opinion, provide additional support and feedback during the intervention period;

"...It would be interesting to meet up with some other people who are doing the project and had sort of a chat about like, sorta what you'd done to sort of motivate you towards what you were trying to achieve. I suppose that would be a good thing because it's always good to share things isn't it. You know, you could support each other, I mean when Dan said about the ten thousand steps and that I wasn't doing that many, if I'd of met someone who said oh, neither have I, you know I wouldn't have felt like I was failing, you know what I mean, it could give you a bit extra motivation".

Helen (10; 266-271)

Another suggested improvement related to feedback was the use of the health assessor to provide a review of progress during the intervention period. This suggestion of the use of the health assessor is in comparison with the suggestion provided by Helen and Sarah in the use of peers in providing support during the intervention period;

"The only thing I really thought of that might be helpful was to actually have review maybe half way through. Erm, because, although, you know, you don't forget that you're doing it but you wanna know a little bit, you want a little boost to be able to think you know well actually you've only got six weeks left now, you know, let's give it a real good push, erm, I mean you do tend to lose a bit of motivation about six weeks in and you

think that actually, if someone, if I got an assessment six weeks in you know it would give me motivation to complete to the end and give it more of a boost".

Joanne (7; 192-197)

Similarly, Gurdeep suggests that additional correspondence, whether it be in terms of a phone call or mail, would have been beneficial in boosting their motivation. However, Gurdeep still recognises the difficulties in carrying out a health promotion intervention in terms of the allocation of resources.

"…Maybe some more correspondence, but that could be difficult, I don't know. Obviously, it's all cost isn't it. Err, but maybe a bit more phone calls, you know, to see how you were getting on, a newsletter or something like that. I know it's all this is time and money and everything".

Gurdeep (10; 274-277)

Looking ahead, Trevor suggested that future programmes could use incentives to encourage current participants *"to draw in others" (23; 686)*, stressing the importance of encouraging others to take part in physical activity.

"Maybe the incentive on the next one is [that] you're not rewarded particularly for your activities but you're rewarded for engaging other people into an activity".

Trevor (23; 686—688)

5.8 Summary

The aim of this process evaluation was to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health schemes and for participating in this intervention.

Qualitative findings suggested that providing a financial incentive within this behaviour change intervention may have promoted intervention uptake for some individuals. For instance, participants who attached a low value to the impact of the incentive reported that they would have participated regardless of the incentive. Alternatively, those who placed a high value on the incentive suggested that it was essential for their participation. Participating in the WTB intervention provided the 'incentive' needed to initiate a healthier lifestyle through physical activity. Different intervention components were reported by participants to be important for initiating and sustaining engagement in

the WTB intervention. Qualitative data suggested that for some participants the financial incentive was an important component, whereas for others, the pedometer and health assessment were more significant motivators for initiating and maintaining participation.

Participants cited that taking part in the WTB intervention was a positive experience. Qualitative data seemed to suggest a *'wanting'* to participate in physical activity rather than perceiving it as a *'chore'*. The main benefits that individuals attributed to the WTB intervention were general health and well-being, and preventing the onset of illness and disease. Participants perceived themselves as getting fitter with an awareness that their bodies were better able to cope with the demands of physical activity as their level of activity increased. Positive psychological outcomes were also reported in relation to improving self-esteem and confidence. Taking part in physical activity was also perceived to contribute to a feeling of general well-being and acted as a tool for addressing negative thought processes, as a way of relieving stress and gaining the space and time to reflect.

Individuals who took part in qualitative discussions suggested that they were situated at various points along the behaviour change continuum. This therefore suggests that the intervention was delivered to individuals of varying activity levels, including those who were sedentary and those with established levels of activity. For example, a proportion of participants stated that the WTB intervention changed their thought processes in that they were more likely to think about carrying out positive health behaviours. In relation to creating and maintaining habitual behaviour, a number of individuals stated that they were 'on the way' to achieving this goal or were confident in continuing to participate in physical activity when analysing their future intentions.

The pedometer and health assessment were key motivating intervention components for a large number of participants. The pedometer acted as a prompt to carry out physical activity and was highlighted as a mechanism for self-monitoring, promoting awareness and goal setting in the maintenance of new and already established physical activity. In addition, many participants suggested that having health related measures, such as, body weight and blood pressure taken by a trained assessor, helped to sustain their motivation throughout the intervention period. Similarly, the delivery setting of the health assessment was valued as it provided an opportunity to have a health check in a less

formal, more interactive and more accessible setting than visiting their local general practitioner.

In summary, employing a qualitative methodology provided the researcher with the opportunity to tap into the experiences, perspectives and interpretations of WTB participants. It facilitated the identification of novel insights and understandings of taking part in incentive-based scheme to encourage physical activity. Investigating a 'real-world' health promotion programme ensured that the research was relevant and it was possible to apply findings directly to practice and influence future delivery. This study supported the use of an incentive-based intervention, in combination with other intervention components, delivered in a community-setting to this population. In addition, the findings of this study have widespread generalisability as the study included a socioeconomically diverse sample from a large geographical region around one area of the UK. Results from the process evaluation of the WTB intervention presented in this chapter and implications for practice is discussed in Chapter 7.

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Chapter 6

This chapter has presented information relating to a process evaluation of the WTB intervention. To expand on this and the results of the outcome evaluation (Chapter 4), Chapter 6 presents the results from the conduction of two in-depth case studies to further explore the sustainability of behaviour change in the WTB intervention at an individual level using a mixed methods design. A further two case studies can be found in Appendix 20. Quantitative data collected as part of the outcome evaluation of the WTB intervention (Chapter 4) was used in conjunction with primary qualitative data collected using semi-structured interviews and analysed using Interpretative Phenomenological Analysis (IPA) (Smith, 1996). Data collected via semi-structured interviews at six-months (presented in Chapter 5) were re-analysed using IPA and additional quantitative data (collected by Sandwell PCT) and qualitative data (collected by the researcher) were collected at 12-months for the purpose of this case-study research.

Chapter 6: Exploring the Longitudinal Impact of Walk to Beijing Intervention Participation: A Case-study Analysis

6.1 Introduction

This chapter presents a longitudinal case-study of WTB participants using a mixed methods approach. The use of mixed methodology in psychology has been explored in Section 3.4.1 and it has been argued that combined use of quantitative and qualitative methodologies is compatible with maintaining paradigmatic integrity in health-related research. A case study approach was used with the purpose of combining quantitative and qualitative research methods in order to investigate the topic under study. This chapter presents the quantitative and qualitative methodologies employed to develop four case studies in order to investigate the longitudinal impact of participation in the WTB intervention at an individual level. Interpretative Phenomenological Analysis (IPA) is introduced and its suitability for use in this case study evaluation is presented. The methods of data collection are justified in this chapter followed by a discussion of results and conclusions drawn. Ethical considerations for a qualitative research methodology have been presented in Section 5.5. Researcher reflections relating to the case study analysis are presented in Section 7.8.

6.2 Methods

6.2.1 The Case Study Approach

The case study constitutes an approach to the study of singular entities, which may involve the use of a wide range of diverse methods of data collection and analysis (Willig, 2008). The case study approach is particularly suited to research questions, which require detailed understanding of social processes and phenomena within their contexts using a variety of data sources. This ensures that a phenomenon is not explored through one lens, but rather a variety of lenses which allows for multiple facets of an issue to be revealed and understood (Baxter & Jack, 2008).

6.2.2 Interpretative Phenomenological Analysis (IPA)

IPA is a recently developed qualitative approach, which since its inception, has rapidly become one of the best known and most commonly used qualitative methodologies in psychology (Smith, 2011). IPA has theoretical roots in Phenomenology, Husserlian hermeneutics and Symbolic Interactionism (Smith, et al., 1997). Phenomenology is a philosophical movement concerned with lived or human conscious experience (Giorgi, 1995) i.e., how phenomena are seen within a individual's consciousness as they engage in the world around them (Willig, 2008). Symbolic Interactionism, also influenced by Phenomenology, is primarily concerned with first person viewpoints and the meaning individuals ascribe to specific events (Smith, 1996). The theory posits that individuals attribute meanings to events through a process of conscious self-reflection that is influenced by their social and symbolic interaction with others (Denzin & Lincoln, 1998). IPA is phenomenological because it explores peoples' perceptions of the world and their experiences in it (Willig, 2008) and is interpretative, or hermeneutic, in that it gives the researcher a key, interpretative role in making sense of peoples' subjective, spoken or written accounts. According to Smith (2004), IPA involves a double hermeneutic in which;

"[the] participant is trying to make sense of their personal and social world; the researcher is trying to make sense of the participant trying to make sense of their personal and social world." (p. 40).

IPA therefore acknowledges the position of researchers and their role in processing the data analytically and in interpreting the participants' lived experiences. IPA is also data-driven and the non-prescriptive nature of the method allows flexibility in the way the analysis is conducted. This methodology utilises an idiographic approach study, which allows for a commitment of in-depth, detailed examination of individual cases with importance being given to the meanings participants assign to their experiences (Shaw, 2001).

Characteristics of IPA research are summarised in Box 1.

Box 1. Characteristics of IPA research

Adapted from Reid at al. (2005)

- IPA is inductive.
- Participants are recruited for their personal expertise in the phenomenon under investigation.
- IPA analysis is rigorous and systematic to structure and simplify the data.
- Analyses retain an idiographic focus while also giving an account of what is shared by participants.
- Successful analyses are interpretative, transparent and plausible.
- IPA researchers should practice reflexivity throughout the process.

6.2.3 Comparison with Other Methods of Qualitative Data Analysis

Various approaches to qualitative analysis have been developed with differing perspectives and epistemological stances. In order to determine the most appropriate method of analysis in this study it was essential to assess the relative advantages and disadvantages of alternative methodologies. This section will consider such alternatives in relation to the research question postulated in this study.

As mentioned previously in Chapter 5, Section 5.4.3, Grounded Theory (Glaser & Strauss, 1967) involves the progressive identification and integration of categories of meanings from data with the aim of building a theoretical analysis (Willig, 2008). Grounded Theory was developed to allow new, contextualised theories to emerge directly from the data with no predicted preconceived ideas of how the theory will develop. Grounded Theory methodology allows the researcher to map the social processes and their consequences to the participants; however, unlike IPA it is not designed to explain the experiences of an individual (Willig, 2008). The individual is the central component of IPA, whereas, in Grounded Theory, the focus is the social and the cultural paradigms influencing a particular group. It is therefore important in Grounded Theory that participants are representative of the population under study, whereas, in IPA, participant samples tend to be smaller and usually homogenous (Langdridge, 2007). As the aim of this case study investigation was not to develop a new theory but explore the idiosyncratic experiences of participants, Grounded Theory

was excluded as an alternative method of data analysis. Interpretative Phenomenological Analysis (IPA) aims to explore in-depth an individual's view of a particular phenomenon with importance given to the meanings an individual assigns to these experiences (Smith & Osborn, 2008). Therefore IPA was deemed a more appropriate method of analysis.

An alternative qualitative analysis method is Content Analysis. As discussed in Section 5.4.2, this method often provides counts and allows for quantitative analyses of initially qualitative data to be performed (Ryan & Bernard, 2000), in contrast IPA themes are not quantified. Content Analysis was excluded as a method of data analysis as it is a reductionist method with a loss of data due to the reliance on frequency counts (Wilkinson, 2003). This is therefore a deductive rather than data-driven, inductive, process which is incommensurate with the current research aims. This case study research aimed to explore the longitudinal impact of the WTB intervention by examining individual experiences and interpretations of participation. Therefore, Content Analysis was deemed inappropriate for this research.

As previously discussed in Chapter 5, Discourse Analysis is concerned with the relationship between language, thoughts and feelings (Willig, 2008). This method emphasises the way in which versions of the world, of society, events and inner worlds are produced in discourse (Potter & Wetherell, 1995). A basic tenet of discourse analysis is that people use language to construct versions of the social world; that language is not a neutral and transparent medium through which people are able to express themselves, but is constitutive (Harré, et al., 1995). IPA and Discourse Analysis are similar in that they both enable researchers to recognise the importance of language, however, proponents of these methods differ in their beliefs relating to cognition (Smith, Jarman, & Osborn, 1999). IPA is primarily focused on an individual's belief's about a specific phenomenon, but recognising that this cannot be directly derived from text (Smith, et al., 1999). In comparison, proponents of Discourse Analysis are sceptical about the link between discourse and underlying cognitions. Discursive psychology has strengths in revealing the action-oriented nature of language and its achievements within specific contexts, however, it does not provide insights into the individual's inner experience. IPA was therefore deemed a more appropriate method to investigate an individual's experiences of participating in the WTB intervention.

Narrative approaches (Riessman, 1993) to data analysis allow researchers to understand how participants construct meaning and make connections between events and interpret them and bring order to experience (Willig, 2008). However, such methods do not shed light on what actually happened to the participants and how such events affected them at the time of their occurrence. The nature of the current research aimed to understand the experiences of participants and therefore Narrative Analysis was not deemed inappropriate.

Thematic analysis, used in Chapter 5, is a method for identifying, analysing and reporting patterns (themes) within data (Braun & Clarke, 2006). Thematic analysis is a flexible approach that can be used across a range of epistemologies and research questions. The process evaluation of the WTB intervention, presented in Chapter 5, employed Thematic Analysis (Boyatzis, 1998) to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health-promotion schemes and for taking part in this specific intervention. An inductive Thematic Analysis from an essentialist, realist perspective was conducted reporting meanings and perceptions of participants (Braun & Clarke, 2006). Thematic Analysis was deemed a potential alternative to the use of IPA in this case study investigation, however, IPA was considered more suited to investigate the longitudinal impact of the WTB intervention in a small number of participants. The rationale for this analysis method is presented in Section 6.3.

6.2.4 IPA Data Collection Methods

Given the theoretical background and the idiographic, inductive and questioning nature of IPA (Smith, 2004), the most widely advocated and used method of data collection is the semi-structured interview. A schedule of open questions, supplemented by prompts if necessary, is designed to encourage the interviewees' personal reflections and to elicit extensive responses from them (Gillham, 2005). The semi-structured interview as a method of data collection has previously been detailed in Section 5.3.1. A semi-structured interview aims to ensure the researcher's agenda is addressed while retaining a sufficiently flexible structure to explore new areas of interest that may emerge during the interview. The semi-structured interview was deemed most appropriate for the purpose of exploring the longitudinal impact of WTB participation using a case study

approach. This method is also commensurate with IPA, the selected method of data analysis.

6.3 Rationale

The epistemological stance taken by qualitative research and IPA, in particular, offers an opportunity to explore varied understandings of the processes of behaviour change, from adoption to maintenance. It allows the meaning of the barriers that an individual might face to be placed within their personal, social and cultural context. IPA lends itself to the idiographic study of the lived experiences of individuals. It is a method developed in order to understand the subjective experience of an individual and the cognitions and emotions that underlie their views about a particular topic, with the emphasis on personal attitudes and perceptions (Smith, 1996). The use of IPA also affords the ability to focus on individual differences between participants whilst understanding each individual case. Its selection for this study is based on its suitability for generating appropriate data required to address the research question. This involves exploring the longitudinal impact of WTB participation on sustainable physical activity behaviour change and investigating participants' experiences, attitudes and motivations towards physical activity and incentivised health-promotion schemes. Semi-structured interviews were used to facilitate the collection of rich data across multiple time points to produce four case studies (two of which are presented in the appendices) with the aim of establishing a deeper understanding of the impact of WTB intervention participation at an individual level.

6.4 Process of Data Collection and Analysis

6.4.1 Setting

Consistent with the data collection practices presented in Chapters 4 and 5, quantitative data were collected via health assessments and qualitative data via semi-structured interviews for each case study participant. The location of data collection for each participant is indicated in Table 42. For each case study participant, health assessments were conducted at baseline (Figure 36, T1), three- (Figure 36, T2), six- (Figure 36, T3),

and 12-months (Figure 36, T4). Semi-structured interviews were conducted with case study participants at six- (Figure 36, T3) and 12-months (Figure 36, T4). The interviews were conducted immediately after the participants' health assessments. This means that qualitative data collected at six-months was also used in the process evaluation of the WTB presented in Chapter 5. In comparison, qualitative data at 12-months was specifically collected for the purposes of exploring the longitudinal impact of WTB intervention participation on four individuals.

6.4.2 The Health Assessor

Quantitative Data Collection: Health Assessments

Health assessments were carried out by four qualified health and fitness assessors, recruited from the local area. All assessors carried out the health assessments as part of their current role, for example, through GP referral systems and demographics of the health assessors can be found in Section 4.2.4. All health assessors participated in a training workshop in order to standardise delivery of the WTB assessments. This was also facilitated through the use of a guidance pack consisting of information regarding the order in which measurements and data were to be collected (Appendix 4). This secondary data was then provided to the researcher for analysis.

6.4.3 The Interviewer

Qualitative Data Collection: Semi-Structured Interviews

The interviews were conducted by a 25 year old, white, female, researcher employed by Staffordshire University (GH). The interviewer is a reasonably fit individual who participates in competitive sport (netball and hockey) on a regular basis and has a keen interest in health and fitness. All semi-structured interviews were conducted by the same interviewer.

6.4.4 Sampling and Recruitment

Figure 36 shows the process of participant recruitment and participant flow for the outcome (Chapter 4) and process (Chapter 5) evaluation of the WTB intervention. As described in Section 4.2.4, participants were required to undertake a health assessment

at baseline (Figure 36, T1) and immediately after the three-month intervention period (Figure 36, T2). Participants were then given the opportunity to take part in a further health assessment at six-months (Figure 36, T3). However, no financial incentive was offered for improvements in objective health measures over this time period. Quantitative data, as described in Section 4.2.5, were collected from participants during these health assessments. Participants (n=30) were recruited to take part in qualitative data collection at three- and six-months (Figure 36, T2 and T3) for the purposes of a process evaluation of the WTB project presented in Chapter 5. This chapter aimed to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health-promotion schemes WTB participation.

Following this, case study participants were recruited pragmatically. The sample from which case study individuals were selected contained participants who had completed their baseline and three-, or six-month health assessments and therefore received the WTB intervention. This sample also included participants who had indicated consent for subsequent contact to be made post-intervention completion.

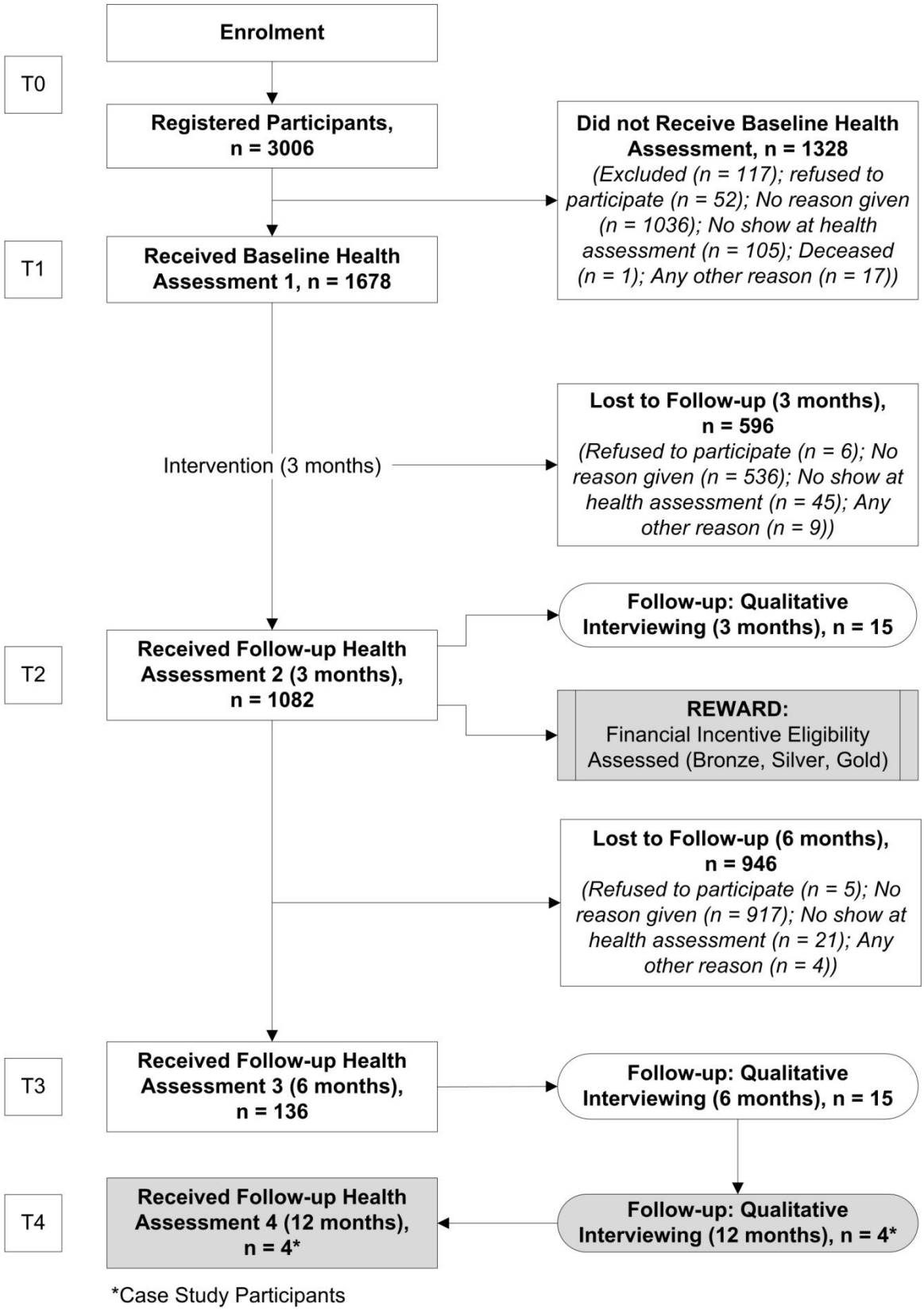

Figure 36. *Intervention Structure and Participant Flow*

Of the 30 individuals who had taken part in three- or six-month health assessments (Figure 36, T2 and T3), 20 indicated consent for further contact. Subsequently, four individuals provided consent to participate in an additional follow-up health assessment and semi-structured interview at 12-months (nine months post-intervention, Figure 36, T4). Each case-study participants had taken part in qualitative data collection at six-months (Figure 36, T3) with no individuals from the three-month qualitative participant pool agreeing to take part.

As an idiographic method, samples of this size are recommended when using IPA as the analysis of large data sets may result in the loss of potentially subtle inflections of meaning (Collins & Nicolson, 2002). A consensus towards the use of smaller sample sizes is emerging due to the in-depth nature of phenomenological inquiry (Reid, et al., 2005; Smith, 2004)

Table 42 provides demographic characteristics of case study participants. All four participants were female and White British with a mean age of 56.50 $\pm$ 11.90 years. Two participants resided in Smethwick and two in Tipton.

Table 42. *Case Study Participant Characteristics*

Pseudonym*	Gender	Age	Ethnicity	Town of Residence	Occupation	Location of Data Collection
1. Kate	Female	46	White British	Smethwick	Psychologist	Smethwick Swim Centre
2. Julia	Female	47	White British	Tipton	Housewife	Tipton Sports Academy
3. Valerie**	Female	69	White British	Smethwick	Retired	Smethwick Swim Centre
4. Louise**	Female	63	White British	Tipton	Counsellor	Tipton Sports Academy

Note. * Participant selected pseudonym. ** see Appendix 20 for these case studies.

6.4.5 Procedure

Case study participant recruitment mirrored the procedure detailed in Section 5.6.5 and extended to include an additional health assessment and semi-structured interview at 12-months. Information sheets and consent forms for the primary qualitative data collected at 12-months can be found in Appendix 20. This section will report the quantitative and qualitative data collection procedures that were undertaken.

Quantitative Data Collection Procedure

Case study participants received four health assessments conducted at baseline, three-, six-, and 12-months. Each health assessment was conducted according to the procedures presented in Section 4.2.4. Measurements taken during each health assessment included; blood pressure, waist-hip ratio (WHR) and height and weight (to calculate body mass index [BMI]). Participants also completed several questionnaires, including; Stage of Change (TTM) Question; Theory of Planned Behaviour Questionnaire, EQ-5D, SF12v2, in addition to several questions regarding participants' motivations and influences for taking part. At the second health assessment, carried out at three-months, step count, level of reward and reward type was also recorded.

All participants were also screened using the Physical Activity Readiness Questionnaire (PAR-Q) to ensure individuals were not suffering any contraindications for exercise prior to taking part in the intervention. Quantitative data was recorded in accordance with the process described in Chapter 4.

Qualitative Data Collection Procedure

Qualitative data collection took place immediately after the participants had received their six- and 12-month health assessments and therefore the locations for semi-structured interviews and focus groups were local leisure facilities, social clubs, YMCA's or community centres. Participants were given a £10 gift voucher (high street, supermarket or leisure voucher) as a token for taking part.

The semi-structured interviews were conducted following the stages presented in Section 5.6.5. Data collection at 12-months was guided by the development of an interview schedule that was informed by prior qualitative data collection with WTB participants presented in Chapter 5, and refined over the course of the interview process. The participants were asked to recall their initial motivations for taking part in the

intervention, prior expectations, intervention goals, current behaviour and future intentions. Participants were also asked to comment on the impact of the intervention overall including the associated reward. The interview schedule provided an outline of the areas of interest and encouraged exploration of topics as they developed rather than being prescriptive. The interview schedule can be found in Appendix 19. Typically, the interviews lasted 30-40 minutes.

6.4.6 Process of Analysis

Within this study, a mixed-method approach was used to gain an insight into the longitudinal impact of WTB intervention participation on sustained behaviour change and the experiences, attitudes and beliefs of four individuals using an inductive approach. This section will report the quantitative and qualitative data analyses that were undertaken.

Quantitative Data Analysis

Descriptive accounts of quantitative data collected during the participant's health assessments at baseline, three-, six-, and 12-months were produced. The WTB intervention was delivered from baseline for a period of three months. A descriptive account of change over time in stage of change and health status for each case study participant is presented in Section 6.5.

Qualitative Data Analysis

This section considers the process undertaken during data analysis. Following the conventions of IPA, an idiographic approach to analysis was adopted, and each transcript (two per case study; six- and 12 months) was examined in detail on a case-by-case basis. Analysis was completed through a process of engagement and interpretation of the text generated from semi-structured interviews at two time points.

Interview data were transcribed verbatim using Microsoft Word and page numbers and continuous line numbering were used to provide a reference to the original transcript for quotations included in results reported in this chapter. The transcription conventions employed in this study are outlined in Appendix 16. Each case study participant is referred to by a pseudonym.

The process of data analysis began during the data collection period as the researcher first became aware of participant responses and experiences of the WTB intervention. Following this, during transcription, the researcher becomes aware of the potential themes that are likely to emerge which initiates a period of familiarisation with the data. Subsequently, this was followed by a process of re-reading the interview transcripts in order to become familiar with the transcripts. The stages of analysis presented in Table 43 were then followed with each transcript analysed separately. As themes emerged from the transcript the researcher continually checked to ensure that the transpiring theme was evident in the text and accurately reflected participant opinion (Smith, et al., 1999). This process was completed for all transcripts and care was taken to ensure that each transcript was treated separately.

Table 43. *A summary of the IPA analysis process (Langdridge, 2007)*

Stage 1	Transcripts are read and re-read and comments are added to the left-hand margin relating to the meaning of particular sections of the transcript. These comments may be summaries, associations or interpretations and not all sections will warrant a comment. The aim of this stage is to state what is going on within the text, generally staying close to the inherent meaning in the text rather than more interpretative remarks.
Stage 2	Emerging themes are noted in the right-hand margin and initial notes are transformed into more meaningful statements reflecting a broader level of meaning across sections of text.
Stage 3	Themes are listed separately (and in chronological order). The researcher attempts to identify common links between themes and reorder them in a more theoretical or analytical way. Some themes will cluster together, where others will be required to be broken down. Researchers continually return to the text to check the emerging analysis.
Stage 4	A table of themes is then produced in a coherent order. Themes are named appropriately and each theme is linked to the originating text through reference to specific quotes.

6.4.7 The Role of the Researcher

In IPA, the researcher is integrated into the research process, playing an active role particularly during data analysis. It was therefore essential that I was reflexive in my approach and that the potential impacts of my personal and professional characteristics on the conduct of the research and the interpretation of the findings were fully documented. IPA is an interpretative methodology and as such the aim of IPA is to understand and make sense of another person's sense-making activities. It is mediated by researchers as they are attempting to interpret the participants own understanding of world. As the researcher, I was aware of the impact that I may have on the outcome of the research and documented and reflected upon this throughout the research process. A reflexive diary was used to assist with acknowledging this influence. A reflexive account is presented in Section 7.8 showing the outcomes of this reflexive process.

6.5 Case Studies

This section presents results from two of the four case studies in order to develop a deeper understanding of WTB intervention participation over time at an individual level. Two case studies, Kate and Julia, were selected for inclusion in this chapter as they are both White British and of a similar age (46 and 47 years, respectively) which makes comparisons between them in terms of their experiences of the program particularly interesting. Kate was a psychologist who resided in Smethwick and Julia a housewife who lived in Tipton. They were both non-smokers with no reported underlying health issues. However, they differed in their measures of health status. For example, Kate had a BMI which classed her as having a healthy weight, whereas, Julia was classified as obese. Kate and Julia also differed in their self-reported stage of change (TTM) in relation to physical activity and reported step count averages over the intervention period. At baseline Kate reported being in the maintenance stage, whereas Julia was in the preparation stage. This therefore allowed for comparison of the impact of WTB participation on two individuals with similar demographic characteristics but differed in their measures of health status. Two additional case studies of two older women (Valerie and Louise) are included in Appendix 20.

Each case study is presented individually citing demographic information, health status at baseline, three-, six-, and 12-months, followed by results from qualitative data collected at six- and 12-months. Although quantitative and qualitative data will be presented in separate sub-sections, quantitative data will be referenced within the qualitative sub-section to further explain findings. Subsequently, Section 6.6 will triangulate and discuss quantitative and qualitative data across each case study to provide an overview of the impact of WTB intervention participation.

6.5.1 Case Study One: Kate

6.5.1.1 Demographic Information

Kate was a 46 year old, White British female who resided in Smethwick and was employed as a Psychologist. Kate reported being a non-smoker with no underlying health issues.

6.5.1.2 Quantitative Results: Health Status and Health Assessment Outcomes

Kate took part in four health assessments conducted at baseline, immediately post-intervention (at three-months), at six-months and 12-months (nine months post-intervention). During these health assessments, several objective and subjective measures were taken and assessed over time. Table 44 presents the measurements and outcomes of each health assessment.

Kate's BMI ranged from 23.18 to 23.46 kg/m^2, placing her in the 'healthy weight' classification. Kate's WHR decreased from 0.78 at baseline to 0.74 at 12-months, which was mirrored in the waist circumference measurements taken at baseline (78cm) and at 12-months (74cm). According to the World Health Organisation criteria (2008), Kate's WHR value and waist circumference were not considered high risk. Kate's blood pressure measurements ranged between 104/70mmHg and 128/63mmHg at each health assessment, which were also considered optimal / normal (BHS-IV) (Williams, et al., 2004).

Table 44. *Health Assessment Outcomes: Kate*

	Health Assessment			
	Baseline	**3-month**	**6-month**	**12-month**
Objective Measures				
BMI (Kg/m^2)	23.46	23.28	23.36	23.18
BMI Classification*	Healthy Weight	Healthy Weight	Healthy Weight	Healthy Weight
Waist-Hip Ratio	0.78	0.76	0.75	0.74
Waist Circumference (cm)	78.00	75.00	75.00	74.00
Blood Pressure (Systolic/Diastolic) (mm Hg)	128/63	104/70	111/65	125/70
Subjective Measures				
Physical Activity: Stage of Change (TTM)	Maintenance	Maintenance	Maintenance	Maintenance
SF12v2 – Physical Component Score (PCS)	58.02	58.57	57.76	-**
SF12v2 – Mental Component Score (MCS)	50.38	51.77	57.06	-**
Perceived Health Status (EQ-5D)	90	90	97	98
Intentions (TPB)	2.0	3.0	3.0	3.0
Perceived Control (TPB)	6.0	6.50	6.75	7.0
Attitude (TPB)	2.33	3.0	3.0	3.0
Subjective Norms (TPB)	6.0	6.67	6.33	6.67

Note.* Based on WHO Classifications (Chapter 4, Section 4.2.5). ** Missing data.

Stage of Change is related to the TTM (Prochaska & DiClemente, 1982), which has been previously described in Section 2.4.1 and 4.2.5. At each health assessment Kate reported that she was in the maintenance stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

As described in Chapter 4, Section 4.2.5 perceived health was measured using the SF12v2 health survey. Kate reported a higher than average score of physical health, which remained fairly consistent at baseline, three- and six-months. In comparison, Kate's mental health component score demonstrated an increase from baseline to six-

months. However, Kate's mental health score remained lower than her physical health score across baseline, three- and six-month health assessments.

Perceived health status was also measured using the EQ-5D health thermometer which requires participants to rate, on a scale of 0-100, how they feel at a specific point in time. A value of zero equates to the worst possible health state and a value of 100 equals the best possible health state. Kate reported scores of between 90 and 98 at each of her health assessments, illustrating a perception of excellent health.

In relation to the TPB, four subscales were measured during each health assessment; intentions, perceived behavioural control, attitudes and subjective norm. The TPB constructs were measured using questionnaire items with 7-point response scales, anchored at each end with descriptive labels. Kate indicated positive views towards her intention to participate in physical activity in the near future, and this increased from baseline to 12-months (-3 to +3). Similarly, Kate scored highly in the perceived control subscale, reporting perceptions of being 'very capable of participating in moderate physical activity in the future' across all health assessments (+1 to +7). Kate similarly reported a positive attitude towards participating in moderate physical activity in the future at each health assessment (-3 to +3). The subjective norm subscale relates to the perceived social pressure to perform or not perform a particular behaviour (+1 to +7). Kate scored positively on this scale, perceiving that her significant others were supportive of her physical activity behaviour.

These measurements formed the criteria for three levels of a financial incentive, bronze (£10), silver (£20) and gold (£40). Participants were only eligible for a reward if: (1) they attended their baseline (HA one) and three-month (immediately post-intervention; HA two) health assessments; and (2) submitted a pedometer report card recording the number of steps taken on each day of the intervention period (Chapter 4, Section 4.6). The level of financial incentive received was then related to the level of health improvement over the intervention period. The basic level of incentive was the bronze award which was received if participants adhered to the two conditions described above with no improvements in objective health assessment measures. Silver and gold awards were received if there was an improvement in up to two and three or more improvements in objective health assessment measures, respectively. Participants were able to choose between two types of rewards: a high street voucher or a grocery

voucher. Sandwell PCT's Physical Activity team was responsible for calculating change in health status over the intervention period and subsequently the level of reward received.

As Table 44 shows, Kate made improvements in four of the objective health assessment measures over the three-month intervention period (health assessment one versus health assessment two), so received the Gold award and elected to receive the grocery voucher.

As previously mentioned, in order to be eligible for any reward participants were required to record the number of daily steps taken throughout the intervention period. Kate reported walking a total of 775,112 steps over the three-month intervention period, approximately 8,612 steps per day. Given that between 2,000 and 2,500 steps is equivalent to walking one mile (Hill, Wyatt, Reed, & Peters, 2003), this equates to 3.4 - 4.3 miles per day over the intervention period.

During their baseline health assessment, participants were also asked to report the extent to which (not at all; a little; a lot) intervention components influenced their decision to take part, including the: pedometer; reward; support; town competition; and link to the Olympic Games. Kate reported that the support and town competition components of the intervention influenced her decision to take part 'a lot', the pedometer and link to the Olympic Games influenced her decision 'a little' and the reward had no influence ('not at all').

6.5.1.3 Qualitative Results: Semi-structured Interviews

This section reports the results from the analysis of qualitative data collected from Kate at six- and 12-months. Reference will also be made to objective and subjective measures of health status and additional information collected during health assessments at baseline, three-, six- and 12 months. Where quotations are provided in the text they will be labelled by time of collection (six- or 12-months).

The following analysis is structured around five super-ordinate themes that emerged from the data, each with a number of sub-themes:

1. **Influencing Factors for Participation**
2. **Stage of Change**

3. **Motivating Intervention Components**
4. **Inhibitory Factors**
5. **Overall Perceptions and Intervention Development**

The following section discusses each super-ordinate theme in turn and their relationships with connected sub-themes are highlighted. Each super-ordinate theme will be presented, incorporating direct quotes from Kate to illustrate and describe opinions held and where appropriate, reference will be made to the quantitative data collected.

1. Influencing Factors for Participation

This theme examines the factors which influenced Kate's decision to take part in the WTB intervention. Identifying particular intervention characteristics that influence an individual's decision to participate will be beneficial to future service delivery and intervention development.

The Health Assessment

For Kate, the opportunity to receive a health assessment was a primary motivating factor. To Kate, the health assessment represented a means by which her behaviour could be monitored by another person and a way in which she could be made accountable for her behaviour;

"I think just to have somebody monitoring what… well, the health assessment was one key thing as I don't routinely get that and, you know, somebody's going to be monitoring what I did really, so that was helpful".

(6m, 1; 20-22)

Adding to this, at her 12-month interview, Kate referred to the fact that she did not routinely receive a health assessment from her General Practitioner (GP).

"Partly I wanted the health assessment because I don't get that at the GP's or anywhere else".

(12m, 3; 69-70)

Primary care has been considered as an appropriate setting for lifestyle and physical activity promotion (Gidlow & Murphy, 2009) given a GP's level of population access as a frontline service. However, it has been recognised that many GP's lack the capacity and training to act as behaviour change agents (Gould, Thorogood, Iliffe, & Morris, 1995). The delivery of health assessments in non-clinical settings, by trained physical activity and exercise professionals, provides an alternative mode through which lifestyle and physical activity can be delivered. Kate clearly valued the opportunity to participate in an intervention that included a health assessment. Over the course of 12-months, Kate received a health assessment on four separate occasions i.e. at baseline, three-, six-, and 12-months. Research has supported the provision of regular follow-ups in increasing the likelihood of sustained behaviour change (Hillsdon & Thorogood, 1996).

The health assessment as an intervention component also provided the contextual element of support. Kate particularly valued the fact that the health assessment allowed someone to take *'time and interest'* in her as an individual;

"I think the fact that somebody is taking a bit of time and interest in you is important, so I think that's another benefit that having the regular checks does".

(6m, 11; 325-326)

The Incentive

Kate held several different views in relation to the potential influence of the presence of a financial incentive or reward. As illustrated in the quotation below, Kate stated that, for her, the reward was not the primary factor that influenced her decision to take part in the WTB intervention. In this quotation, she goes on to reiterate that the monitoring of her behaviour (via regular health assessments) was the main intervention component that attracted her to the intervention;

"Well that was very nice. I didn't do it for the reward… well, actually it was very nice to have that but… I was just glad to have someone who was monitoring me really".

(12m, 5; 128-129 and 141)

The following quotation reveals Kate's thought processes behind this perception, citing employment as a factor mediating the level of influence a reward may have on an individual's decision to take part;

"Well, that was nice but, I suppose 'cos I'm employed, it wasn't a huge incentive. It wasn't the main thing for me".

(6m, 4; 121-122)

When asked whether the reward would be useful for other people, Kate stated;

"Yes, definitely, especially in this area, I reckon there would be a lot of people to whom that that would be a big boost".

(6m, 5; 134-135)

Kate further highlights this point during her 12-month interview. Although the presence of a reward did not significantly influence her decision to take part in the intervention she was aware of the potential influence it may have on 'others':

"Yes, I think it could be [influential]. Certainly some of the people I've passed information on to where their income is quite low at the moment that [the reward] would be an incentive for them. So I think it is good that you're doing that".

(12m, 5; 147-149)

Something to Motivate

The WTB intervention provided Kate with a way of motivating herself to participate in more physical activity and exercise. Kate recognised that, during a period of change (i.e. a recent location change), it was becoming more difficult to participate in exercise or physical activity and therefore she was actively looking for a means through which she could motivate herself to address this;

"…and also just because I'd moved into this area, which meant that my journey to work was longer, so I was aware that getting exercise was a bit more difficult. It was, for me, a way of motivating myself to do more".

(12m, 3; 70-72)

The views expressed by Kate in relation to the factors influencing her decision to take part in the intervention were commensurate with information collected during her baseline health assessment. For example, Kate reported that the support and town competition components of the intervention influenced her decision to take part 'a lot',

the pedometer and link to the Olympic Games influenced her decision 'a little' and the reward had no influence ('not at all').

2. Stage of Change

This theme refers to current, changes in, and future intentions relating to levels of physical activity behaviour and consequently the stage of change that the participant is positioned in, according to the TTM (Prochaska & DiClemente, 1982). At each health assessment Kate reported that she was in the maintenance stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

Current Levels of Physical Activity

During qualitative data collection, Kate was asked to describe a typical week in relation to her physical activity behaviour and reported;

"Well, Monday I would generally get quite a bit of exercise, Tuesday I try and have a walk in the evening, Wednesday is a difficult day 'cos I do a long day at work including into the evening, so that's a day I'm aware I get very little done, Thursday, again, I would perhaps do some walking or cycling, Friday I've started running now with a group after work. That's quite… that's a very new thing. That's only in the last month I started that. At the weekend I try not to use the car, I try to walk or cycle when I can and I swim usually on a Sunday".

(12m, 1-2; 25-31)

This suggests that Kate participates in some form of activity, whether it be walking, running, cycling or swimming, on most days of the week. In terms of duration of activity, when asked to describe a typical bout of walking or cycling, Kate reported;

"That varies, probably between a mile and two miles [walking] I suppose. If I cycle, I might cycle…yesterday I went out on my bike and I did about six miles. So that would vary with cycling".

(12m, 2; 37-39)

This qualitative data provides some supporting evidence to the stage of change that Kate positioned herself in at each health assessment. Furthermore, Kate reported walking a

total of 775,112 steps over the three-month intervention period, approximately 8,612 steps or 3.4 - 4.3 miles per day.

Change to Stage of Change / Physical Activity Behaviour

In relation to changes in Kate's physical activity behaviours over the course of the WTB intervention, at her six-month interview, Kate reported;

"I did more walking once I started the project".

(6m, 8; 225)

This perception was reiterated during her 12-month interview as Kate went on to report that she was participating in more physical activity through cycling and experienced corresponding physiological improvements;

"Yes, I think I am doing more walking than I used to since I started that. I'd had the bike a few months when I started it, so I am doing more cycling than I used to, I think 'cos my stamina's increased".

(12m, 2; 55-57)

Kate's perceived physiological improvements (i.e. in stamina) are also supported by the objective and subjective measures of health status taken during each health assessment (baseline, three-, six- and 12-months). For example, Kate maintained her BMI, her waist-hip ratio decreased from 0.78 at baseline to 0.74 at 12-months. Similarly, Kate also reported scores of between 90 and 98 (out of 100) on the EQ-5D health thermometer at each of her health assessments, illustrating a perception of excellent health (Section 6.5.1.2).

As a psychologist, Kate demonstrated awareness and reflected upon the importance of physical activity for an individuals' psychological health during her six-month interview;

"'Cos I know as a psychologist I'm interested in people's mental health obviously, as well, and I'm aware that by doing more exercise my mood lifts and so I think it is important to have this kind of project".

(6m, 10; 311-313)

Future Intentions

When discussing Kate's future behavioural intentions relating to physical activity, she stated that she was confident in her ability to continue to be active and potentially increase her levels. In this quotation Kate talks about maintaining her cycling and swimming activities and the desire to participate in dance classes in the future;

"Yes. I think now, 'cos I've got the bike, when I bought the bike I thought, I'm spending a lot of money on this, I'd better use it. So actually I've enjoyed riding on it, so that's one thing I will do. The swimming, I'm reasonably motivated to do that and I would like to do some dance. Since I moved here I haven't managed to find a class I like. So that's something I would like to look at".

(12m, 8; 222-226)

In this quotation, Kate discusses her desire to improve her running ability especially as she values the social support aspect that this activity provides her with;

"Yes, so the running I would quite like to improve really. That's quite nice as that's the only bit of exercise at the moment that I do with other people. Occasionally I walk with others but the swimming I do on my own, so… and the cycling generally… Sometimes I do that with a friend but… Yes, it's nice from a social point of view as well".

(12m, 8-9; 248-252)

The impact of social support on physical activity participation has been demonstrated in the literature. Research has shown that social support interventions to increase levels of physical activity, such as walking groups and 'buddy systems' can increase time spent engaging in physical activity and frequency of exercise (Kahn, et al., 2002). Studies have also shown that having a spouse and/or supportive family and friends are positively associated with increased physical activity (Sallis, et al., 1992; Sternfeld, et al., 1999).

The following quotation further supports Kate's desire to increase her physical activity levels;

"I think I would like to increase it [physical activity] a bit I think, 'cos it's OK at the moment but if I manage to get on OK with the running… I'm not a natural runner so I know that if I work at that it will become easier".

(12m, 8; 240-242)

Data collected during Kate's health assessments provides support for the qualitative data collected. For example, in relation to the TPB four subscales were measured during each health assessment. Kate indicated positive views towards her intention to participate in physical activity in the near future, and this increased from baseline to 12-months. Similarly, Kate scored highly in the perceived control subscale, reporting perceptions of being 'very capable of participating in moderate physical activity in the future' across all health assessments. Kate also reported a positive attitude towards participating in moderate physical activity in the future at each health assessment. The subjective norm subscale relates to the perceived social pressure to perform or not perform a particular behaviour. Kate scored positively on this scale, perceiving that her significant others were supportive of her physical activity behaviour.

3. Motivating Intervention Components

This theme relates to the intervention components that Kate perceived as motivating. During qualitative discussions Kate revealed that the health assessment and the pedometer were key motivating intervention components.

The Health Assessment

Unsurprisingly, Kate identified the health assessment as a key motivating factor during participation in the WTB intervention;

"I think the health assessment is quite important really, 'cos when you know somebody is going to check it, for me it does, it does make quite a difference. Well I noticed it was encouraging me to come and see the progress and that made me want to do more. So that was good".

(6m, 7; 215-218)

The health assessment not only impacted upon Kate's initial decision to take part but also acted as a continuous motivating factor throughout the intervention period and beyond.

The Pedometer

The pedometer was also highlighted as a key motivating component by Kate. Review level evidence investigating the effectiveness of pedometers suggests that their use is associated with significant increases in physical activity, equating to approximately 2,000 steps or one mile per day (Bravata, et al., 2007). For Kate, the pedometer was a mechanism for self-monitoring raising awareness of activity levels and goal setting;

"I think that being accountable, so having to record my steps, I found that really helpful when I did the first three months. That was, for me, very motivating and if I noticed it was low I would then think I'd better go for a walk or... and I think I was quite surprised when I... just how many steps I did in a day, 'cos in my job I do sit down a lot but I do have to go backwards and forwards, so actually I was quite pleased to see I was getting quite a few steps in. So that was good, to get that feedback... and I think, because I was recording it, that was quite helpful".

(12m, 3; 84-90)

The pedometer also acted as a cue for increasing Kate's physical activity behaviour on a day-by-day basis;

"Yes. It was very good to have it because of... sort of part way through the day I would check to see how many steps I was doing and then I would aim to increase".

(6m, 3; 73-75)

Although no specific target was set in relation to the number of steps each participant should achieve per day, it was clear that, for Kate, this would have been a motivating factor;

"Yes. I think because it made me more conscious of what I was doing and for me, having the feedback at the end of each day as to how many steps I'd done; I found that quite encouraging. I think, earlier on, I got... 'cos I'm working in the health profession myself, I've got a friend, who's a school nurse, and she was saying about how many steps you were recommended to do [10,000], which I think would have been helpful to know at the outset. When I realized how many I was supposed to do, I increased".

(6m, 3-4; 87-93)

However, there was a potentially negative aspect to Kate's desire to set and work towards a target of 10,000 steps per day in that she may have increased her walking but

this may come at the expense of participating in other forms of potentially higher intensity physically activity;

"Yes because if I was doing stuff around here, I would think about cycling or walking. Although, one of the things I noticed was that I did… it was better to walk than cycle in terms of the number of steps I did, so perhaps I did walk more than I might have done".
(6m, 6; 168-171)

4. Inhibitory Factors

This theme relates to the inhibitory factors or barriers to participation in physical activity faced by Kate and include: safety; a sedentary job; responsibilities; and time.

Safety

Issues of personal safety were highlighted by Kate as being an inhibitory factor to physical activity. In this quotation provided by Kate during her six-month health assessment, she eludes to the fact that her level of physical activity is related to the ability to walk in the evenings which is in turn influenced by changes in sunlight and season;

"I suppose the only barrier for me, being on my own, is the safety thing, so actually in the evenings I might walk so that's probably getting a bit less with the evenings".
(6m, 6-7; 186-188)

This perception is further supported in qualitative data collected during Kate's 12-month interview which states that she is more likely to participate in physical activity in the evenings due to the increased levels of sunlight;

"I would like to do a bit more than I am but now the weather's improving and the evenings are lighter it's actually easier. I'm more inclined to walk than before".
(12m, 2; 45-49)

A Sedentary Job

Kate also highlighted that her work and commuting patterns mean that she is sedentary for large proportions of the day. Kate was aware of, and 'bothered by' her levels of

sedentary behaviour, however, she felt that she was limited in what action she could take to address this due to the structure of her day;

"Yes. I do worry about the days when I'm at work because of the journey I do to work in the car and the job I do is very sedentary, that does bother me but there's not much I can do about that because of the way my day is structured".

(12m, 2; 45-47)

In an attempt to overcome this barrier Kate reports that she tries to participate in physical activity during her lunch breaks, however, she does find it difficult to maintain this;

"Well, my job in that… well, what I do… when I was doing it first of all I would sometimes go for a walk at lunch time, which I didn't do before, and I have continued that but perhaps not as much".

(6m, 6; 184-186)

Responsibilities

Existing responsibilities were also highlighted by Kate as inhibitory factors to physical activity. For example;

"One of the things that… I belong to a local Church and actually I could walk to Church but because we've got some elderly people who can't get there, I have to take the car, so that's one area where I think I would walk but I don't because I'm giving other people a lift. That happens with some of the meetings, so it's looking after other people does mean that I don't do quite as much".

(12m, 4; 118-122)

Here, Kate has described how if it wasn't for her responsibility to others she would be able to incorporate more physical activity into her life.

Time

Time constraints are frequent barriers to physical activity participation (Sherwood & Jeffery, 2000) and this was also reported by Kate as an inhibitory factor. Here, Kate, describes how on certain days of the week, it is difficult to participate in physical activity;

"...like I work a really long day on a Wednesday and that, you know, when I looked at the record for that day it was hopeless really but I would then just compensate for that on other days".

(6m, 7; 203-206)

However, Kate also describes how, as a result of this lack of time on certain days, she attempts to compensate for this by participating in physical activity on other days of the week.

5. Overall Intervention Perception and Intervention Development

This theme draws on Kate's overall perceptions of the WTB intervention and subsequently her suggestions for development and improvement.

A Positive Experience

Kate reported that participating in the WTB intervention was a positive experience which is further supported by the fact that she encouraged others to take part;

"I think it's been excellent. Really, I've enjoyed it. I've recommended it to other people so I think that says it all really. I wouldn't have done that if I thought it wasn't any good".

(12m, 5-6; 155-157)

Intervention Improvements

In relation to suggested changes to the intervention as a whole or to specific aspects Kate would like to see further guidance on pedometer positioning;

"Well, I had trouble using mine. I kept putting it in the wrong place. I noticed that some days I would look at it and it wasn't registering so I perhaps needed a bit more guidance on that when I first put it on".

(6m, 9; 275-277)

Kate also suggested that the intervention could be enhanced if the health assessments could also provide guidance on other health behaviours, such as healthy eating;

"I think it would be a big help to have conversation around the kind of food diaries and… I know I've got a reasonable idea about that but it's interesting that my weight and waist measurement have gone up slightly but I'm also aware that I've had a run of eating out more, just because of social arrangements, but I'm… so I think that that sort of thing would be quite useful to look at and perhaps have a bit more guidance on".

(6m, 10; 285-291)

This view was also expanded upon during qualitative data collection at 12-months;

"...the only thing I would have thought might be useful is to help people think about their food intake...Or just to keep a food diary that somebody looks at with you to advise you".

(12m, 6; 172-175)

According to Kate, the intervention could be further improved through the addition of other health measurements, for example, monitoring the cholesterol levels of participants. Kate does, however, recognise the potential issues related to this addition;

"I presume…I know you can't do it because it's more of an invasive check but the cholesterol level".

(12m, 7; 206-207)

6.5.1.4 Summary: Kate

In summary, Kate received the Gold award which meant that she had attended her baseline and three-month health assessment, made improvements in three or more health measures, and submitted a pedometer report card. Over the intervention period (baseline to three-months) Kate made improvements to objective measures of health status, including BMI, waist-hip ratio, waist circumference and blood pressure. These measures were subsequently improved or maintained at six- and 12-months. In relation to subjective health status, improvements were made during the three month intervention period in physical and mental health component scores of the SF12v2. Kate's perceived health status according to the EQ-5D was maintained during the intervention period and improvements were made in all TPB constructs (intentions; perceived control; attitude; and subjective norms). Kate reported being in the 'maintenance' stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

Kate was largely motivated by the opportunity to undertake a regular health assessment, something that she does not routinely receive from her GP, and this was influential in her decision to take part. Kate recognised that, during a period of change (i.e. a recent location change), it was becoming more difficult to participate in physical activity and therefore she was actively looking for a means through which she could motivate herself to address this. The WTB intervention provided this opportunity. However, qualitative data suggested that it was the opportunity to receive a regular health check that was a motivator for her to continue to be physically active. Therefore, walking as a lifestyle activity may not have been an appropriate type of physical activity to promote to an individual such as Kate, who reported being in the maintenance stage of the TTM at baseline. Kate did report benefiting from participating due to other intervention components, such as the health assessment. In relation to other intervention components, for Kate, the presence of the financial incentive did not play a role in her initial or continuing motivation. Kate suggested that her employment was the reason for this and postulated that it could be a significant motivating factor for others. This therefore raises the question as to the necessity of offering a financial incentive to certain individuals.

6.5.2 Case Study Two; Julia

6.5.2.1 Demographic Information

Julia was a 47 year old, White British female who was a housewife and resided in Tipton. Julia reported being a non-smoker with no underlying health issues.

6.5.2.2 Quantitative Results: Health Status and Health Assessment Outcomes

Julia also took part in four health assessments conducted at baseline, immediately post-intervention (at three-months), at six-months and 12-months (nine months post-intervention). During these health assessments, several objective and subjective measures were taken and assessed over time. Table 45 presents the measurements and outcomes of each health assessment.

Julia's BMI ranged from 30.45 to 30.80 kg/ m^2, remaining fairly constant across each health assessment. Julia's BMI places her in the 'obese I' classification at each health assessment (WHO, 2013). Julia's BMI did increase slightly from three- to six-months

and this was maintained at 12-months. Julia's WHR was recorded as 0.82 at baseline, which then decreased over the intervention period (baseline to three-months) and remained constant at her six-month health assessment. Following this, Julia's WHR increased from 0.76 to 0.78 at her 12-month health assessment. Julia's waist circumference did decrease from 96cm, which signifies a substantially increased health risk, at baseline to 85cm (an increased health risk) at 12-months (WHO, 2008). Julia's blood pressure measurements also indicated that she was suffering from mild hypertension at baseline. This decreased to the 'high normal' classification at three-months and 'normal' at six-months. This subsequently increased to the Grade 1 hypertension category at 12-months (BHS-IV) (Williams, et al., 2004).

Table 45. *Health Assessment Outcomes: Julia*

	Health Assessment			
	Baseline	**3-month**	**6-month**	**12-month**
Objective Measures				
BMI (Kg/m^2)	30.45	30.45	30.80	30.80
BMI Classification*	Obese I	Obese I	Obese I	Obese I
Waist-Hip Ratio	0.82	0.76	0.76	0.78
Waist Circumference (cm)	96.00	88.00	89.00	85.00
Blood Pressure (Systolic/Diastolic) (mm Hg)	155/89	137/88	127/83	142/93
Subjective Measures				
Physical Activity: Stage of Change (TTM)	Preparation	Action	Preparation	Preparation
SF12v2 – Physical Component Score (PCS)	52.23	53.46	57.49	-**
SF12v2 – Mental Component Score (MCS)	53.92	57.33	54.20	-**
Perceived Health Status (EQ-5D)	55	80	95	94
Intentions (TPB)	3.0	3.0	2.0	2.0
Perceived Control (TPB)	7.0	7.0	6.0	5.75
Attitude (TPB)	3.0	3.0	2.0	2.0
Subjective Norms (TPB)	7.0	7.0	7.0	6.33

Note. * Based on WHO Classifications (Chapter 4, Section 4.2.5). ** Missing data

Julia reported that she was in the preparation stage of the TTM during her baseline health assessment. At three-months Julia moved into the action stage before returning to the preparation stages at six- and 12-months. Movement from one stage to another is often cyclical. The "preparation" stage indicates an intention to change in the immediate future, where as the "action" stage involves actively engaging in behaviour change, but for less than six months. Julia therefore moved from preparation to action over the intervention period, however this was not maintained at six- or 12-months.

Perceived health status was measured using the SF12v2. As Table 45 illustrates, Julia reported a higher than average score (i.e. above 50) of physical health at baseline and this increased steadily at three- and six-months. In comparison, Julia's mental health component score demonstrated an increase from baseline to three-months and a subsequent decrease at six-months. This score was also higher than norm-based averages at each health assessment.

Perceived health status was also measured using the EQ-5D health thermometer. Julia's reported a score of 55 (out of 100) at baseline. This score increased at three-months to 80 (out of 100) rising further at six-months and decreasing by one point at 12-months. Julia's perception of her health state therefore increased greatly during the intervention period (baseline to three-months) and continued to increase at six-months and remaining fairly consistent at 12-months.

In relation to the TPB, Julia scored positively across the four subscales of behavioural intention, perceived behavioural control, attitudes and subjective norms, at her baseline and three-month health. Julia therefore indicated positive views towards: her intention to participate in physical activity in the near future; her capability in participating in moderate physical activity in the future; her attitudes towards participating in moderate physical activity in the future; and her belief that significant others were supportive of her physical activity behaviour during the intervention period. However, at six- and 12-months these scores decreased.

As Table 45 shows, Julia made improvements in three of the objective health assessment measures over the three-month intervention period (health assessment one versus health assessment two). Julia was therefore eligible to receive the Gold award and elected to receive the grocery voucher.

Julia reported walking a total of 468,329 steps over the three-month intervention period, approximately 5,204 steps or 2.1 – 2.6 miles per day over the intervention period.

During the baseline health assessment participants were asked to report the extent to which (not at all; a little; a lot) intervention components influenced their decision to take part, including the: pedometer; reward; support; town competition; and link to the Olympics. Julia reported that the support component of the intervention influenced her decision to take part 'a lot', with other intervention components, including the pedometer, reward and link to the Olympic Games having no influence ('not at all').

6.5.2.3 Qualitative Results: Semi-structured Interviews

This section will report the results from qualitative data collected from Julia at six- and 12-months. Reference will also be made to objective and subjective measures of health status and additional information collected during health assessments at baseline, three-, six- and 12 months. Where quotations are provided in the text they will be labelled by time of collection (six- or 12-months).

The following analysis is structured around six super-ordinate themes that emerged from the data, each with a number of sub-themes:

1. **Motives for Participation**
2. **Impact of Intervention Components**
3. **Health Outcomes**
4. **The Process of Behaviour Change**
5. **Sharing Experiences and Encouraging Others**
6. **Intervention Evaluation**

The following section will discuss each super-ordinate theme in and turn and present associated sub-themes. Direct quotes from Julia will be incorporated to illustrate and describe each theme and where appropriate links will be made to quantitative data collected.

1. Motives for Participation

This theme represents the motives for participation in the WTB intervention held by Julia. Examining underlying motives is beneficial in enhancing understanding of how interventions should be structured in order to appeal to certain individuals.

Prevention of Ill-Health

For Julia, taking part in the WTB intervention provided the opportunity to take measures to prevent future ill-health whilst acknowledging her current health status;

"Nobody can say 'oh, I don't need to do that, I'm fit enough', 'cos you don't know. It's preventative to me. I think that if… yes, I know I'm carrying weight and I could do more exercise than I do, sort of thing, but you don't know. I mean, like heart attacks and things are just waiting to happen. It's out there and rather than wait until it does and then you've got to do something. Why not try and conduct your lifestyle so that it is, hopefully, you know, stopping the inevitable from happening really".

(6m, 2-3; 57-63)

This motive is further supported in the following quotation;

"I mean, I'm not a drinker. I mean, people that drink a lot, smoke a lot, I'm not like that to start with, so I feel as if I'm probably part of the way there but felt that you could still do a little bit more and that's why I decided to do it".

(6m, 3; 80-83)

This motive was again reiterated and further explained by Julia during her 12-month interview. Julia acknowledged the need for individuals to be become aware of their own health status and subsequently take responsibility for it;

"Well yeah, being aware of what they're doing and taking responsibility really, no one else is going to do it for them".

(12m, 11; 320-321)

Julia also acknowledged that her primary motivation was to *'feel better, fitter'* and not specifically to lose weight. Rather, weight loss would be a positive secondary outcome as she recognised her need to reduce her weight. This perception is commensurate with

her objective measures of health status which classified her BMI in the Obese I category (WHO, 2013):

"I've haven't done all of this specifically to lose weight, although yes I would like to lose weight. I know I'm overweight, I could do with losing some but I wanted to just generally feel better, fitter".

(6m, 1; 24-26)

2. Impact of Intervention Components

Several intervention components were identified by Julia as motivators, whilst others had little impact. Extrinsic factors that were perceived as motivating factors by Julia were the pedometer and the health assessment, whereas the presence of a financial incentive had little influence on her motivation or behaviour.

The Pedometer

When discussing the pedometer, various aspects were discussed, For Julia, the pedometer was a mechanism for self-monitoring of behaviour, goal setting and raising awareness of current levels of activity.

For Julia, the pedometer was used to monitor her current levels of activity and served as a motivator to increase her activity levels. Dancing made a significant contribution to Julia's levels of physical activity and the pedometer was used to monitor that contribution;

"I line dance on a Tuesday night. That's my significant contribution to exercise. I've done that off and on for a number of years and this is, as I explained to Dan [the health assessor] before, that I feel that on a Tuesday night I feel that I do a three or four hour class. I've got my pedometer and I wear it constantly and I can do sort of 14 or 15,000 steps just on a Tuesday night".

(6m, 3-4; 88-94)

Julia then compared the step count accumulated through her dance classes with everyday lifestyle activity and recognised that it is difficult to reach the target (presented elsewhere) of 10,000 steps;

"And this is what I've found out of doing this, that it is difficult, other than doing that significantly, to try and do the 10,000 a day. Even though I'm not sitting around at home, if I'm up and down the stairs pulling the vacuum cleaner up, you're walking

[a]round, you're totting your steps up. At the end of an average sort of day, if I've just been at home, it's only around about the 5,000 not the 10,000".

(6m, 4; 94-99)

Julia's estimation that on an average day she takes approximately 5,000 steps is commensurate with the information analysed from her pedometer report card. Over the three-month intervention period Julia reported walking a total of 468,329 steps which equates to approximately 5,204 steps (2.1 – 2.6 miles) per day. This figure is lower than the estimated number of steps that have been estimated to be equivalent to meeting the physical activity recommendation of 150 minutes of moderate to vigorous intensity, accumulated in bouts of 10 minutes or more, per week (i.e. 7,000 steps per day) (Tudor-Locke, Leonardi, Johnson, Katzmarzyk, & Church, 2011).

Although, no specific target was set in relation to the number of steps each participant should achieve per day, Julia was keen to try and meet the target of completing 10,000 steps per day. However, she recognised how difficult this task was, even though she didn't have the time commitments that others may have;

"So, although 10,000 is sort of set as like a relevant… I think that's quite a… you've got to really go at it to try and get that in every day. It means that you're religiously, you know, you've got to set aside half an hour or whatever it is and keep doing something and I find that hard to achieve and that's with not being at work. So people that have got other commitments where time is hard to find it must be even more difficult to do".

(6m, 3-4; 99-105)

The pedometer provided a means by which Julia could assess her own behaviour and subsequently allow her to experience a sense of satisfaction. Julia used the information provided by the pedometer in order to set and monitor self-directed activity targets:

"Well, yes, it's satisfaction. I mean I still keep like a weekly, I mean I've taken me pedometer off tonight and I just log what I've done for the day and on a Sunday I just tot it up and do an average, what the average has been for a day over that particular week and I am, and you know when I do it and I haven't particularly been out much this week and I've done this that and the other and I look at it and I think blimey that's only averaged out at about four thousand a day and last week it was seven thousand a day, you know. You think I need to do something and that's how I'm monitoring it for myself, but that's saying right well next week you've got have a few more days where you do a bit more walking or you've gotta do this activity and I try and do it".

(12m, 9-10; 281-291)

Julia clearly accepted the pedometer and it became part of her daily life and fully intended to keep using it to monitor and motivate her behaviour;

"And now it is part of me; I don't not put my ped on. It's just for my own benefit, I'm still keeping a score every day, at the end of the day when I take my pedometer off at night, just to sort of log and see. So on a week to week basis, I can see if I've done as much this week as last week, or whatever, and that's given me an idea "oh, you need to do a bit more next week".

(6m, 10; 289-293)

This was further supported during her 12-month health assessment;

"It gives me an idea of how I'm doing, really, you know. Like I say, I mean I wear it, I mean I'm wearing it now. I just wear it every day wherever I go it goes round with me. It went round Wembley on Saturday".

(12m, 10; 299-302)

The Health Assessment

According to Julia, the health assessment was a motivating intervention component. The health assessment provided the means by which her health and behaviour could be monitored by another individual. The health assessment provided information over and above what was provided by the pedometer;

"To me, I think coming back to find out how you'd got on because, yes, you sort of gleaned roughly from the figures [pedometer] what you were doing each week but that still didn't tell you, unless someone measured these things, whether it had actually had an effect. And to sort of say, well your waist hip ratio, your blood pressure, yes, you knew then whether you'd been going in the right direction or not".

(6m, 12; 360-364)

The health assessment provided served as an extra motivator for Julia to spur her on to *'do a bit more'*;

"You've got to sort of do it at your own pace, with the benefit of having your assessments and then you think, right I'll just do a bit more, and that's got to be even better and you go on from there".

(6m, 15; 462-465)

For Julia, the health assessment also served as a motivating intervention component to encourage sustained participation. The health assessment represented a way in which she could be monitored and made accountable for her behaviour;

"I think knowing that you are having an assessment on a reasonably regular basis makes you want to stick to it more because you know it's not going to be good if I go and oh he says, you've put weight on, your blood pressures gone up and this that and the other and your BMI, you know, it's nice to be told like Dan [health assessor] said today that like ok you're sort of on course and it's in relationship to where it should be".

(12m, 9; 252-257)

Julia also reflected on the role of the health assessor in the WTB intervention. To Julia, the health assessor provided the opportunity to discuss her health related behaviour and ways to improve it;

"He said "we now need, in your case, perhaps controlling the eating side, it's what you're eating" and I came clean and said, you know, "I eat pork pie and I like this, that and the other", and he was saying "yes, how often are you having that?" and I came clean and told him the truth and he said "well, you should perhaps have that but not every week". He said every couple of weeks. We had a chat about it and I took it on the chin and ***I've tried to implement that****".*

(6m, 13; 402-407)

Again, Julia reflects on the health assessor's approach;

"Dan and his personal approach as well, you never felt that you were sort of sitting with somebody who was going to tell you off or, you know, I mean his approach was very good as well".

(6m, 13; 385-387)

Julia held a positive view of the health assessor perceiving him as a provider of information and also a supportive factor within the WTB intervention;

So I did value his feedback to me because I know he was a personal trainer and whatever. I felt that any questions you had, he answered suitably and more so, really. You didn't feel as if you hadn't sort of ticked any of the boxes, that you were in the dog house for doing so. You left here knowing exactly what you need to do to get back on track".

(6m, 13; 407-412)

This view is also supported by information collected during Julia's baseline health assessment where she reported that the 'support' element of the intervention influenced her decision to take part 'a lot'.

The Incentive

Julia discussed the potential motivating influence of the presence of an incentive, distinguishing between her own motivation and that of others. For Julia, the presence of a reward was not a factor that influenced her initial or continued motivation and as such believed that the level of reward was *'overly generous'*;

"I thought it was overly generous to be quite frank. I mean, I didn't do it for the reward. Yes, I understand that some people might need that as a bit of a push to do it but I just genuinely wanted to do it from the start to prove to myself that over a period of six months, 12 months, whatever, that my sort of, all the things were better".

(6m, 9; 255-259)

In relation to 'others' Julia felt that the incentive may influence their motivation to participate;

"It just depends on the people. Some people need a bit more of an incentive to do it. You know, if you'd have said to me there's no incentive, I would still have taken up the challenge, personally".

(6m, 9; 264-266)

In the following quotation, Julia goes on to reiterate that the monitoring of her health status through regular health assessments was enough of a motivator for her;

"Well, if anything I say they were overly generous, too much, a bit too much really because I didn't do it for that reason. Well, if it'd just been you just get told at your assessment how you've been done that would have been enough for me. But I know that a lot of people wouldn't have done it then cos it was oh, well at least I'll be getting a voucher but I haven't done it for that reason".

(12m; 364-368)

Julia reflected on the impact of the reward on others. Julia recognised that some people may not wish to take part in the intervention without the provision of a reward. She goes on to suggest that such individuals would be taking part from the 'wrong reasons'. This

suggests that Julia perceived that she was participating for the right reasons, i.e. improved health;

"To be honest, I mean, I think that they could make, they could save a bit of money and make it [the reward] lesser but then oh you're gonna put people off saying oh you know, well if there ain't nothing it then I ain't gonna do it. ***But then they're doing it for the wrong reasons ain't they****. You know, I'm doing it to hopefully…the figures that they [show] either you are better or are just as good, you know and if there's glitches where there's areas, when I've been for an assessment where it hasn't improved or whatever then you know that when you walk out that door then you've got to do something about it. It's in your hands to do it so I think the awards too generous, if anything, too much so yeah".*

(12m, 12-13; 379-387)

Julia's perception of the reward is also supported by information collected during her baseline health assessment where she rated the presence of the reward as an intervention component that did not influence her decision to take part ('not at all').

3. Health Outcomes

As previously mentioned, Julia's initial motivation for participating in the WTB intervention was related to the desire to improve her general health and well-being, and preventing the onset of illness and disease. The following quotation illustrates the physical and psychological benefits of engaging in physical activity for her;

"Physically and mentally because I think it's easy, especially this sort of time of the year, you know, with the dull days and the weather and whatever, you just sort of vegetate. You know, you can depress yourself. You can be depressed when there's nothing to be depressed about. Whereas, you know, a day like today you can just go and have a walk, get a bit of fresh air. You've done something, it's got you out the house, you're better for it".

(6m, 8; 243-248)

This quote also illustrates the impact of the intervention on her health and energy levels, identifying that this had improved over the course of the intervention;

"I've felt a lot better in myself. I mean, I've always had a reasonable amount of energy but I think I've had a little bit more, I have had more as it's gone on and I've done more".

(6m, 3; 88-89)

This perception is also supported by information collected during her health assessments. Julia reported a higher than average score of physical health, according to the SF12v2, at baseline and this increased steadily at three- and six-months. Julia's SF12v2 mental health component score also demonstrated an increase during the intervention period. However, this subsequently decreased at her six-month health assessment. Perceived health status was also measured using the EQ-5D health thermometer which rated Julia's current heath status increased from baseline six-months and remained constant at 12-months.

Whilst Julia recognised the health benefits of participating in the WTB intervention she also acknowledges that her health can still be improved. She compared herself with 'others' who [may] have achieved better results' but retained a positive outlook on her ability to remain consistent throughout the intervention;

"But as I've said before I'd be lying if I know that there isn't room for improvement 'cos there is. But you know, if someone comes and says you know, I'm the fittest I've ever been and I've lost tons of weight, you know, there's probably people that have achieved better results than I have but I've managed to sort of be consistent and I think that's quite good".

(12m, 9; 257-262)

The theme relates to Julia's health outcomes after participating in the WTB intervention. Her perceptions of her own health status and the improvements made mirrors the results from objective measures of health status collected during her health assessments. For example, at baseline, Julia's waist circumference of 96cm signified a substantially increased risk to health (WHO, 2008). This figure reduced to 85cm at her 12-month health assessment. This demonstrated an improvement in this measure of health status, however, commensurate with Julia's awareness that there is still room for improvement, this figure still signifies an increased health risk (as opposed to a substantially increased health risk) (WHO, 2008).

4. The Process of Behaviour Change

This theme relates to impact of the WTB intervention on Julia's physical activity behaviour. This theme can also be linked to the TTM as Julia demonstrated that she employed a number of the processes of change as recognised by Prochaska and DiClemente (1982).

The Little Things: Thoughts and Behaviours

This sub-theme relates to the ways in which Julia approached changing her behaviour, which was dominated by discussions focused on changing the 'little things' and included the implementation of processes of change.

Julia reported that by taking part in the WTB intervention she was more likely to think about carrying out positive health behaviours. This is also supported by Julia reporting being in the 'preparation' stage of the TTM during her baseline health assessment. This change in thought processes is illustrated in the following quotation and highlights Julia's use of consciousness raising, which involved finding and learning new facts, ideas and tips that support participation in physical activity. Here Julia describes ways in which she began to think about incorporating different tips and ideas of how to increase her levels of lifestyle physical activity;

"I think consciously I do try and do more and I do sort of. Whereas, I'd probably used to go more places in the car I either don't go in the car or park the car where I've got to walk a bit further and consciously".

(12m, 7; 204-206)

Again, the following quotation illustrates Julia's use of consciousness raising. Julia was aware of the consequences of her health related behaviour and subsequently recognised the extra effort required to carry out healthy behaviours;

"Yeah, you think about it, I mean I'm not saying sometimes you think about things and say oh it's easier to have chips and just blow it, you'd be lying if you said otherwise but at least it makes you stop and think in the first place. ***Whereas, before you'd just do it any way and not think about the consequences.*** *I don't, I'm not like that though now. You know, you think it's not really good for you so it might mean that you've got to put yourself out a bit more because something's gonna take longer to prepare or whatever but it's better for you, so you do it".*

(12m, 8; 234-241)

Similarly, in the following quotation, Julia illustrates her use of counter conditioning which employs the use of healthy behaviours that can substitute less health behaviours:

"…and things like lifts, you go shopping and you can jump in the lift but now I go up the stairs and I don't even think of the lift now whereas before I'd never think of the stairs. So it's silly little things but, you know, and I'll think come on up the stairs and you find yourself saying that, where before I'd be the first one saying, I'm not going up the stairs. You know, so it's the ***silly little things*** *like that".*

(12m, 7; 206-211)

Continuing with the sub-theme of 'the little things', the following quotation illustrated Julia's overall view of behaviour change and healthy behaviour. For Julia, behaviour change is essentially 'common sense':

"You know… and you just think that it all basically is common sense isn't it. It's got to be good if you're not smoking, you're not drinking to excess, eating more of the right things, cutting out the wrong things, ***a little bit more*** *exercise and a bit more… so if you want to do it, it's very good. I must admit that I feel a lot better for it".*

(6m, 8; 233-237)

Julia provided additional examples of her change in thought processes and subsequent behaviours. In the following quote Julia describes her visit to a local spa for a 'pamper day' and her subsequent behaviour;

"You know, we have this pamper day, which I mean everybody would like to do that anyway but it's a day where you want to just sit and chill and do literally nothing you can do, but I didn't go for that…You know, I thought, no, if there's classes erm that's what you go for and I just come back and just so enjoyed the day I mean I'd been in and out the pool all day and me classes, had a bit of, we had a bit of relaxing time in the sauna and things like that but I wanted to go more for the exercise things. Now, if that'd of been me twelve months ago it'd of been oh I'm gonna sit round the side of the pool all day. But that wasn't an option this time. That wasn't an option".

(12m, 13-14; 402-417)

It also appears that Julia's attitude towards exercise and physical activity changed as a result of part in the intervention. This is also supported by the fact that Julia reported being in the 'action' stage of the TTM during her three-month health assessment. For

Julia, dance was an importance part of her exercise routine and in the following quote she describes her approach to this as a form of exercise;

"I'm not sort of super fit if I went in a gym I'd probably last five minutes in a gym but what I do do I'm setting sort of levels and I'm trying to sort of get something out of it rather than just do it to say oh well it was a bit oh exercise. If you don't feel as if you've done it it's not good enough for me and I wouldn't have been like that before. It'd of been oh well you know, you take the easy option".

(12m, 14; 440-444)

Julia also recognised the impact of WTB intervention on other health behaviours, specifically healthy eating. For example, for Julia the health assessment served as a motivator for changing her dietary related behaviours;

"And I think, going on you, when you're coming up to [health assessment time], err, not so much with the exercise, but the actual dietary as well, you try and be healthier".

(12m, 7; 217-219)

The Future

When discussing Julia's future intentions in relation to physical activity, she stated that she was confident in her ability to continue with her established physical activity levels whilst finding new ways of potentially increasing this level. In addition, Julia reported that although the she was aware that the intervention will cease, she will continue utilising components of the intervention. The following quotation illustrates her intention to continue using the pedometer as a way of monitoring her activity levels;

"And I shan't stop it. I mean, even though the Project will finish, I daresay probably in a couple of months time, March/April time, that me personally the pedometer will be worn after that and I shall just carry on as I've been doing for the last 12 months".

(6m, 18; 557-560)

In relation to the impact of the intervention, Julia was clear that she would continue participating in physical activity regardless of whether she was actively involved in the WTB intervention;

"I personally will just carry on anyway, so… It's a standing joke on a Tuesday night now, this is how I've tried to… when we're doing our class, I explained to some of my

friends why I was wearing a pedometer, blah, blah, blah… and it's a standing thing now that every Tuesday night after the classes…"how many steps have we done tonight then"? Again, that's having a bit of an effect on them, without realising that they're doing something good for themselves, even though they haven't signed up individually to do this. It's a standing joke 'cos, I mean, some weeks, it's pretty good and other weeks if the figure's lower we get on to the teacher and say "come on, we're not doing enough tonight" She ups the ante then, you see".

(6m, 21-22; 661-671)

Julia also considered increasing her levels of physical activity as illustrated in the following quotation;

"Yes, you know, and I mean if I… I'm seriously thinking of… I used to do Aquafit, which I haven't done for a while, and I'm thinking of taking that back up. That's something you can go and do. You can do that once a week, it all helps the cause".

(6m, 19; 580-583)

Julia identified that her motivation for taking part in additional activities, such as swimming, improved as a result of the WTB intervention;

"Whereas before you couldn't be bothered, don't want to do it, you know, but you think well, yes, I'd enjoy it. I'm going to be better off for doing it. You know, all the relevant… the BMI, the weight, all the rest of it, is going to be affected by doing that. Swimming's good for you generally, so…".

(6m, 19; 589-592)

5. Sharing Experiences and Encouraging Others

This theme relates to how Julia shared her WTB intervention experiences with a significant other and consequently how the intervention also impacted their behaviour. This theme also reflects on how Julia strived to encourage others in her social network to participate and get involved with the project.

Sharing Experiences and Support

It was clear that Julia was keen to share her experiences of the WTB intervention with her significant other, her husband even though he did not sign up as an individual. In the following quotation Julia describes how her husband, through her encouragement, got

involved with the activities of the intervention. Here Julia illustrates the reciprocal support that her and her husband provided to each other;

"No he didn't [sign up] but I found that because I'm doing it, that it's "oh, come on, let's go for a walk" so he's sort of, in a way, got involved in it, which is good for him as well".

(6m, 11; 326-328)

Persuading Others

Julia consciously made the effort to encourage others to increase their lifestyle activity through walking. For example, the following quotation illustrates how Julia tried to 'sell' walking to her husband and his 'football friends' and encourage them to walk to the stadium when going to watch a game;

"Yeah, you know and I'll nag him, you know, and say, oh just go on, you know, while you're doing it [walking] you're have natter and you're bonding and all of this and they said yeah, well it's more sociable because if you're in the car you're there in two seconds flat and you haven't really said anything but because it's a 15-20-minute walk they start nattering about whatever and they said it was more sociable and they found that, you know, they discuss more and talk about, you know, and so from that point of view and they're walking. So, I just did it [WTB] because I can't see what's, any disadvantage in it, in doing it".

(12m, 7; 191-198)

During qualitative discussions it was clear that Julia was committed to trying to encourage others to live healthier lifestyles. Julia also acknowledged the role that significant others have to play in motivating individuals to become active;

"I make walk to the [football] ground now. The one guy, he's an ambulance technician so he ought to know better, but he's little and he's fat and like he only walks when he has to but I've got him doing it and he'll say to me you're my pain you are. But I've got him doing it, but if his wife would do that, I'm not saying he'd be super fit but it would make a difference wouldn't it".

(12m, 6; 181-185)

However, Julia acknowledges that *"there's got to be a variant of the will power to start with"* (12m, 2; 50) and therefore this encouragement is not always successful;

"You know, and I keep trying to sell her the benefits, saying well when I went and had me assessment three months, six months, whatever, blood pressure was down, blah, blah, blah. You know, trying to make her think, and she'll say oh yes, you know, I will do it and she hasn't so you can't make people do it can you".

(12m, 2; 39-43)

6. Intervention Evaluation

This theme draws on Julia's overall evaluation of the WTB intervention and centres on her experiences and attitudes towards the intervention approach as a whole in addition to specific components.

The Intervention Approach

Julia reflected upon the general intervention approach and described her view of the general aims of the project. Here, Julia identifies the basic premise of the intervention in promoting lifestyle physical activity;

"So I think the whole object of this, which I feel I've proved, is that any sort of exercise, just walking or doing a bit of line dancing or some sort of classes that you enjoy or gardening, anything that is within your ability will help the cause and I think that's the point that needs to get across; you don't have to go to the gym to get that bit of exercise and to get on the right track to getting healthy really".

(6m, 5; 139-144)

For Julia, this type of approach was preferable to alternatives, such as going to the gym. Julia recognised that exercise is 'something you enjoy doing' and should be fun *"it's not a chore, it's an enjoyment"* (6m, 6; 164). Julia also suggests that a wide range of individuals should be able to find an activity that is well suited and enjoyable to them;

"Yes and that's, that [the gym] wouldn't be me. I wouldn't like to think I've got to go to the gym once or twice I week but, I mean, I enjoy my class; it's a social night out, it's good exercise, it's something you enjoy doing so you don't really think "oh, I'm doing exercise" 'cos you're doing it, you know, and there's lots more for instances other than that, that I think people of all different ages and abilities could get involved with. As long as it's something they enjoy doing that's an active sort of thing".

(6m, 5-6; 152-158)

According to Julia, what participants were required to do as part of the intervention was realistic and achievable. To Julia, the goal of the intervention was to make changes to 'the little things' which, in turn you could build upon. Julia illustrated that this approach was motivating in comparison to *'going from one extreme to the other'*;

*"It's **just little things** that made a difference and I think that the main thing is that people would think they've significantly got to change things and go from one extreme to the other and I don't feel as if I've had to. It's beneficial and, if anything, because it's beneficial you then want to up the effort because you can see that it's just better that you're going in that direction. So you sort of start small and build on it and I think that's the right way to go. Don't feel pressurised into going one from total extreme to the other, 'cos I don't think you'll do it then".*

(6m, 15; 455-462)

In relation to the intensity of the intervention, Julia was complimentary. She felt that if the intervention was too intense then this would have been potentially de-motivating for others;

"I think the danger is, we've flagged up previously, is that if you make it a little bit too intense, it puts people off straight away. If there are constraints or things that they might not achieve, it might put them off. I didn't have a problem with that".

(6m, 12; 371-374)

Julia was positive about the intervention's 'laid back' approach. For Julia, this approach enabled her to take responsibility of her own actions; you were not bound by an 'obligation' which consequently placed an emphasis on her own intrinsic motivation;

"I think, to me, it's got quite a laid back approach to it, which I think is good because you just feel as if you're not under obligation. It's entirely up to you".

(6m, 13; 382-384)

The following quotation also supports this view, describing the impact of this 'laid back' approach on her own motivation;

"It's a completely voluntary thing. It's up to you how you feel and because of that you feel as if you want to prove you can do it. You're not under pressure to do it".

(6m, 7; 213-215)

The Health Assessment

When reflecting on the health assessment, Julia stated that their frequency was 'about right' and sufficiently motivating;

"The intervals I think are about right because you could have, you know, if you make them more often I can't see the sense in that and if you have them too long you might get into bad habits and think oh I can't be bothered. So, it's nice just as you're probably thinking you've [the PCT] have forgot about me, you haven't, you know and that's been good cos it's like, oh three, six month assessment, whatever, erm, it's err, I think the intervals were about right. I can't think of anything that I would change".

(12m, 12; 352-358)

This was also supported by her opinions provided during her six-month health assessment;

"I think if you start putting a lot of constraints and things on, or making assessments perhaps more frequent than there were previously, or whatever, it might put people off".

(6m, 12-13; 380-382)

For Julia, the health assessment was a way of identifying areas for improvement and ways in which this could be approached. To Julia, a negative health assessment outcome was just as valuable as a positive one and that individual's shouldn't perceive it as a 'knock back', rather as way to get back on the right track;

"I felt that if I've done it for the first few months, came for my assessment and was told "oh, you're going in the wrong direction, you're worse than you were three months ago", then you should take that on the chin and do what you need to do sort it. Whereas, I think some people probably feel obliged that they've got to keep improving. Yes, ideally, you do but if you don't you shouldn't see it as a knock back, you should see it as a thing to say right, what you've got to do, you do it".

(6m, 12; 374-380)

A Positive Attitude

Julia held a positive attitude towards the WTB intervention, stating that she could not see *'how this project fails'*;

"Well, I'm like that with anything I'm quite positive, if I think something's right then I put 100 percent into it. That's my outlook generally on things I mean my views and things like that if I think something's right I'll be honest about it. Erm, you know if I feel passionately about something then I do and I can't just see where this [WTB project] fails".

(12m, 16; 487-491)

To support this, Julia's desire to take part in the WTB intervention again was unquestionable; *"yes, I would yes without any question what so ever"* (12m, 11; 338).

Julia demonstrated this positive attitude in the following quotation. Here Julia discusses how her continued engagement with the intervention is a marker of her 'genuine interest'. She states that this is in comparison to 'others' who may be lacking in motivation or interest and therefore would not have reached their 12-month health assessment;

"I think those who weren't gonna get anything out of it then they wouldn't come for their assessments now you're twelve months down the track they would have shied off before now, that's what I would say. If it's like oh I can't be bothered or I've got no will power or I'm not interested then you wouldn't have seen them the last few times. The people that are still coming now such as me have obviously got a genuine interest and just want to improve I would think, you know, right".

(12m, 17; 515-521)

When Julia was asked whether this project was a good or bad way to spend public money she reported;

"Yes, I do, because I mean, it is fact that we're becoming a nation of obese people. I mean, it's well publicised and you only have to look, you know, you can be out and about and one in, I don't know, four or five people are overweight; either a little bit or vastly. Something's got be done and, at the end of the day, most of it is something that individuals can do for themselves. It needs something like this and, I think, with the Beijing Olympics, yes it was an ideal link but if they could think of other ways and means to flaunt it for all people, ages. You know, younger people as well, 'cos even children now, supposedly, are… some of them sort of 13, 14 years old, are overweight".

(6m, 15-16; 472-480)

6.5.2.4 Summary: Julia

In summary, Julia, a 47 year old, White British female who was a housewife and resided in Tipton participated in the WTB intervention over a 12-month period. At the end of the three-month intervention period Julia received the Gold award which meant that she had attended her baseline and three-month health assessment, made improvements in three or more health measures, and submitted a pedometer report card. Over the intervention period (baseline to three-months) Julia made improvements in objective measures of health status, including, WHR, waist circumference and blood pressure. Julia also demonstrated improvements in subjective measures of health status, including; physical and mental health component scores of the SF12v2 and perceived health status according to the EQ-5D. In addition, all TPB construct scores were maintained (intentions; perceived control; attitude; and subjective norms). Julia reported being in the 'preparation' stage of the TTM at baseline, and moving into the 'action' stage at the end of the intervention period.

Qualitative data illustrated that general health and well being, and preventing the onset of illness and disease were key motivators in Julia's decision to take part in the WTB intervention. Julia saw the WTB intervention as an opportunity to become more aware of and take responsibility for her own health status whilst receiving support via regular health assessments. Her primary motivation was not to lose weight, although Julia perceived that this would be a positive, secondary outcome. This is linked to her recognition that her health would be benefited by losing weight. The initial motivation reported by Julia during qualitative data collection was also supported by the information provided during here baseline health assessment which cited that the provision of support influenced her decision to take part.

Therefore, the WTB intervention presented Julia with the opportunity to learn more about her own health status whilst improving her levels of physical activity. Julia valued the intervention approach in terms of promoting lifestyle physical activity. This suggests that for a White British, 47 year old female who was a housewife, the promotion of walking is an acceptable and accessible form of activity that could be incorporated into her daily life. Julia also reported that different intervention components had an impact on her initial and continuing motivation. For example, the health assessment was reported to an important motivator for Julia. In comparison, Julia reported that the

financial incentive was not a necessary intervention component as she would have participated and continued to participate in its absence. This therefore provides evidence to suggest that for a 47 year old, female housewife from the area of Tipton, a financial incentive was not an important or influential intervention component.

6.6 Case Study Discussion

This section will discuss the two case studies presented in Sections 6.5.1 and 6.5.2, identifying differences and commonalities in WTB intervention participation. Results from the analysis of quantitative and qualitative data from Kate and Julia will be used to discuss the impact of the WTB intervention on: physical activity, health status and participant experiences. Evidence will also be collated in reference to the impact of individual intervention components and participant evaluations of the WTB intervention in general. An overall discussion, incorporating findings from this mixed methods, case study analysis, is presented in Chapter 7.

6.6.1 Initial Motivation

In relation to the initial motivation for WTB participation, Kate and Julia differed. Julia's primary motivation for taking part in the WTB intervention was related to health and well-being (to feel better, fitter) and the prevention of ill-health. Julia saw the WTB intervention as an opportunity to become more aware of and take responsibility for her own health status whilst receiving support via regular health assessments. Her primary motivation was not to lose weight, although Julia perceived that this would be a positive, secondary outcome. This is linked to her recognition that her health would be benefited by losing weight. The initial motivation reported by Julia during qualitative data collection was also supported by the information provided during here baseline health assessment which cited that the provision of support influenced her decision to take part.

In comparison, Kate's initial motivation was not specifically related to health improvement but to her desire to increase her physical activity levels. Kate recognised that, during a period of change (i.e. a recent location change), it was becoming more difficult to participate in exercise and therefore she was actively looking for a means

through which she could motivate herself to address this. The opportunity to undertake a regular health assessment, something that she does not routinely receive from her GP, was influential in her decision to take part.

Therefore, the health assessment was the common factor which influenced both Kate and Julia's initial motivation for participation.

6.6.2 Physical Activity and Behaviour Change

At baseline there were differences in classification of stage of change between Kate and Julia which subsequently influenced the way in which their behaviour was influenced by WTB participation.

Kate reported being in the 'maintenance' stage of the TTM at each health assessment, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more. This is supported by Kate's recollection of her current physical activity behaviour. Similarly, Kate's reported level of walking over the intervention period suggests that she is highly active, i.e., undertaking 8,612 steps or 3.4 - 4.3 miles per day. According to Tudor-Locke, Leonardi, Johnson, Katzmarzyk and Church (2011) approximately 8,300 steps per day is a good proxy for 30 minutes of daily moderate to vigorous intensity activity for females. Kate reported an increase in her levels of walking over the intervention period, however, this may have been at the expense of other forms of physical activity which are potentially higher in intensity. Therefore, this suggests that the WTB intervention had little impact on Kate's overall levels of physical activity but rather intervention components, such as the pedometer or health assessment provided additional motivation for sustaining her behaviour.

Kate was confident in her ability to continue to be active and potentially increase her levels of physical activity. However, she also recognised that there were a number of barriers to her current and future physical activity participation. For example, personal safety, a sedentary job and commuting patterns, responsibilities and time.

In comparison to Kate, Julia reported that she was in the preparation stage of the TTM during her baseline health assessment. The "preparation" stage indicates an intention to change in the immediate future; this corresponds to information provided by Julia during qualitative data collection. Julia reported that by taking part in the WTB

intervention she was more likely to think about carrying out positive health behaviours. This was further evidenced through her use of processes of change such as, consciousness raising leading to a change in thought processes (Prochaska & DiClemente, 1982). At three-months Julia moved into the action stage before returning to the preparation stages at six- and 12-months. The "action" stage involves actively engaging in behaviour change, but for less than six months. Julia also provided evidence for her use of counter conditioning, substituting less healthy behaviours with healthier ones and therefore a change in behaviour. Julia therefore moved from preparation to action over the intervention period, however, this was not maintained at six- or 12-months, with Julia reverting back to the preparation stage. This is inconsistent with qualitative data collected at six- and 12-months as she stated that she was confident in her ability to continue with her established physical activity levels whilst finding new ways of potentially increasing this level. Julia reported that WTB intervention participation was a 'kick start' to her physical activity behaviour.

Julia recorded walking a total of 468,329 steps over the three-month intervention period which equates to approximately 5,204 steps or 2.1 – 2.6 miles per day. Therefore, according to Tudor-Locke et al., (2011), Julia did not meet the physical activity recommendations of accumulating 150 minutes of moderate-to-vigorous physical activity per week.

6.6.3 Intervention Outcomes

Both Kate and Julia received the Gold award which meant that they had attended their baseline and three-month health assessment, made improvements in three or more health measures, and submitted a pedometer report card.

Over the intervention period (baseline to three-months), Kate made improvements to objective measures of health status, including BMI, WHR, waist circumference and blood pressure. These measures were subsequently improved or maintained at six- and 12-months.

Similarly, Julia made improvements in objective measures of health status, including WHR, waist circumference and blood pressure. These measures improved over the intervention period and were subsequently maintained or worsened at 12-months. However, for those measures which did not improve, levels remained above those taken

at baseline. Julia's BMI, however, was maintained at three-months but increased at six-months and maintained at 12-months.

In relation to subjective measures of health status, for Kate, improvements were made during the three-month intervention period in physical and mental health component scores of the SF12v2. Kate's perceived health status according to the EQ-5D was maintained during the intervention period and improvements were made in all TPB constructs (intentions; perceived control; attitude; and subjective norms).

Julia also made improvements in subjective health indicators of physical and mental health (SF12v2 and EQ-5D) over the intervention period (baseline to three-months). Subjective measures of physical health (SF12v2) and perceived health status (EQ-5D) improved further at six-months. This was also supported by Julia's perceptions of improvements in her health and energy levels over the course of the intervention.

The impact of changes in objective and subjective measures of health status on a particular individual is dependent upon their baseline levels. Kate and Julia demonstrate differences in their health status at baseline. For example, Kate has a BMI which places her in the healthy weight classification, where as Julia was classified as obese (I). Similarly, Julia's WHR, waist circumference and blood pressure measurements were higher than Kate's at baseline. This was also the case for subjective measures of health status measured by the EQ-5D and physical component score of the SF12v2. In comparison, Julia scored higher on the mental component score of the SF12v2 than Kate at baseline. When comparing the relative change in health status of from baseline to three-months, Julia demonstrated greater improvements in WHR, waist circumference and perceived health status (SF12v2 mental and physical component scores and EQ-5D). This therefore suggests that WTB intervention participation had a greater impact on Julia than Kate, i.e. those with a poorer health status at baseline.

6.6.4 Impact of Intervention Components

Both Kate and Julia reported that the health assessment was a key factor which influenced their initial and continuing motivation. As previously mentioned, for Kate the health assessment provided her with a regular health check that she did not routinely receive from her GP. For Julia, it provided a means through which her health could be monitored by another individual and her behaviour made accountable which impacted

on her sustained engagement. The health assessor also provided the opportunity for discussions around health behaviours and ways in which it could be improved. The health assessment and health assessor provided support to Kate and Julia for behaviour change.

The pedometer was also identified as being a motivating intervention component by Kate and Julia. For both, the pedometer provided a mechanism for self-monitoring of behaviour, goal setting and raising awareness of current levels of activity. It also served as a cue for increasing levels of walking on a day-by-day basis. Interestingly, both Kate and Julia made reference to a target of 10,000 steps per day, even though no step-related target was set as part of the WTB intervention. A 10,000 steps per day can be traced back to an early commercial message that was associated with the sale of pedometers in Japan (Tudor-Locke & Bassett Jr, 2004). Both individuals expressed their difficulty in reaching this self-imposed target. For example, Julia reported that it was difficult for her to reach 10,000 steps per day even in the absence of potential barriers, such as time and responsibility which were reported by Kate. For Kate, setting herself a target of 10,000 steps per day may have had a negative impact on her physical activity behaviour. She may have increased her levels of walking but this may have come at the expense of participating in other forms of, potentially higher intensity, physical activity such as running or cycling. Despite this, it was clear that both Kate and Julia valued the pedometer which is demonstrated in Julia's intention to keep using the pedometer to monitor and motivate her behaviour in the future.

Both Kate and Julia held similar perceptions in relation to the financial incentive. Neither felt that the incentive was a primary factor in their decision to take part or continuing motivation. However, they both recognised that the presence of a financial incentive may encourage others to take part. Kate suggested that employment and income may be a moderating factor for the impact of the financial incentive, stating that for those individuals, it may be a 'boost'. Julia, however, felt that individuals whose primary motivation for participation was to receive a reward were taking part for the 'wrong reasons' and that the incentive was overly generous.

Julia reported that although the she was aware that the intervention will cease, she will continue utilising components of the intervention, such as the pedometer in the future.

6.6.5 Intervention Evaluation

Both Julia and Kate stated that participating in the WTB intervention was a positive experience and this was demonstrated through their encouragement of others to take part and / or change their behaviour. It was clear that Julia was keen to share her experiences of the WTB intervention with her significant other, her husband even though he did not sign up as an individual. Julia also strived to encourage others in her social network to participate and get involved with the project. Julia consciously made the effort to encourage others to increase their lifestyle activity through walking. Julia also recognised the important role significant others can play in supporting physical activity behaviour whilst acknowledging that individual motivation and will power to be successful is necessary. Similarly, Kate recognised the influence and value of social support when participating in physical activity.

For Julia, the promotion of walking as a form of lifestyle activity was preferable to alternatives, such as going to the gym. According to Julia, what was required of participants for this intervention was realistic and achievable. To Julia, the goal of the intervention was to make changes to 'the little things' which, in turn you could build upon. Julia illustrated that this approach was motivating in comparison to 'going from one extreme to the other'. Intensity of intervention was therefore well matched to her needs.

For Julia, the WTB approach enabled her to take responsibility of her own actions, i.e., you were not bound by an 'obligation' which consequently placed an emphasis on her own intrinsic motivation. Julia also recognised that exercise is *'something you enjoy doing'* and should be fun, it should be intrinsically motivating.

The continued engagement of case study participants during the 12- month time period was a marker of their 'genuine interest' in the intervention. Julia stated that this is in comparison to 'others' who may be lacking in motivation or interest and therefore would not have reached their 12-month health assessment. This also demonstrates that the financial incentive was not a key motivating factor in Kate and Julia's continued engagement with the intervention.

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Chapter 7

This chapter has presented a longitudinal case-study of two WTB participants using a mixed-methods approach. Quantitative data collected as part of the outcome evaluation of the WTB intervention (Chapter 4) was used in conjunction with qualitative data collected using semi-structured interviews and analysed using Interpretative Phenomenological Analysis (IPA) (Smith, 1996). Chapter 7 **s**ummarises findings from quantitative and qualitative data from Chapters, 4, 5 and 6. An evaluation of the research objectives is discussed and consideration is given to the strengths and methodological challenges in this research. Future research, recommendations for practice and the implications of this research are considered, with a subsequent commentary on the role of the researcher and reflective account of the research process.

Chapter 7: Discussion and Conclusions

7.1 Introduction

The purpose of this chapter is to bring together data presented in Chapters 4, 5 and 6, to provide a summary of findings in line with evaluation objectives. Study strengths, limitations and implications for future research are then considered before reflecting on how the researcher influenced, and was influenced by, the research.

7.2 Summary of Findings

7.2.1 Who Took Part?

7.2.1.1 Baseline Demographic Characteristics

As presented in Chapter 4, 3006 individuals expressed an interest in the WTB programme and returned a registration card. Of these participants, 1678 received the intervention at baseline and 1082 (64.5%) participants completed their three-month health assessment. Participants were also offered an optional six-month health assessment and 136 individuals took part.

It is important to examine whether the WTB project reached all sectors of the community in terms of demographics and recruitment area and to determine if particular groups of the Sandwell population were not represented in this project.

Compared with the local population, the WTB sample were older (higher representation in the 60-74 year age group), with over representation of women (73.9%), but with an ethnic composition that was similar. Greater representation of women is common in physical activity programmes (Pavey, et al., 2011) and therefore finding this pattern within the WTB population was not atypical. The highest numbers of participants were recruited from West Bromwich, followed by Smethwick, Oldbury and Wednesday. The areas with the lowest recruitment rates were Rowley Regis and Tipton (Section 4.3.3).

7.2.1.2 Baseline Health Status Characteristics

In relation to baseline levels of physical activity, as measured by participant stage of change, the largest proportion of participants were classified as being in the maintenance stage of the TTM. Following this, participants were classified as being in the preparation stage, with the smallest classified in the pre-contemplation stage. It could be argued that the reason for the small proportion of participants in this category is that the characteristics of 'pre-contemplators' are such that they are not actively seeking to engage in any behaviour change activities in the foreseeable future and therefore may not consider taking part in an intervention such as this. The number of participants recruited who were classed as being in the preparation stage was encouraging as this is the target group that are actively seeking ways to increase a particular type of behaviour.

Overall, the health profile of WTB participants at baseline in relation to BMI, WHR, waist circumference, and blood pressure indicated that the intervention reached individuals in need of improving their health status (Section 4.3.4). For example, the majority of WTB participants at baseline were overweight, followed by those with a healthy weight and those classed as obese I. A higher percentage of individuals who were classified as obese were recruited into the WTB project compared to the prevalence of obesity in the Sandwell population. Both WHR and waist circumference for males and females signified an increased health risk and approximately 40% of participants were classified as suffering from hypertension, ranging from mild to severe (Section 4.3.4).

Conversely, analysis of subjective measures indicated that participants reported a positive perceived health status, when comparing mean EQ-5D score to UK norms. This value is perhaps a result of exclusion criteria that precluded recruitment of those with medical contraindications. According to UK norms, participants in this sample were above average in perceived health status in all sub-scales of the SF12v2. In terms of the summary component measures, participants scored slightly higher on the mental component summary score compared to the physical component summary score. Within the WTB intervention, the incongruent findings from subjective and objective measures of health status has implications for the allocation of each level of the financial incentive which is further discussed in Section 7.6.1.

In summary, evaluation of baseline health status of WTB participants has identified that a number were overweight, had a high WHR, a waist circumference that indicated an increased risk to health and suffering from hypertension. Therefore, participants recruited into this project were those individuals who would benefit from taking part in physical activity and Sandwell PCT's services.

7.2.2 Who Dropped Out?

At baseline, 117 participants were excluded and 1211 chose not to continue, such that 1678 participants received the intervention; a 55.8% uptake (defined as the percentage of registered individuals who attended their baseline health assessment). Of the 1678 participants who received their baseline health assessment, 30.7% were lost to three-month follow-up, and 87.5% of the remaining 1082 participants were lost to six-month follow-up.

Participants who completed a baseline health assessment and subsequently failed to complete a three-month health assessment were significantly younger than those who continued. This pattern was then reversed with significantly older individuals continuing to six-months compared to those who dropped out at three-months. This is also consistent with the finding that a significantly higher proportion of retired individuals continued to three- and six-months compared to those who dropped out at these time points. In addition, there was a significant difference in the ethnicity of participants dropping out at three- and six-months compared to those who continued. This indicated that a higher proportion of BME groups dropped out compared to those who continued. In relation to stage of change, a higher proportion of those in the contemplation and preparation stages dropped out compared to those who continued at three- and six-months. This was incongruent with the WTB aim to promote physical activity in the most sedentary. There was no difference between those who continued and those who dropped out at each time point in: gender; participant location; BMI; EQ-5D; and SF12v2 PCS with the exception of those who continued at three-months (compared to drop outs) in mean MCS score.

7.3 Evaluation of Objectives

This section provides a summary of findings in line with evaluation objectives (see Section 1.10).

1. To determine whether offering a financial incentive increased uptake and attendance at a health assessment

The rate of uptake in the WTB intervention, defined as the percentage of individuals who attended their baseline health assessment after initial registration, was 55.82%. This compares favourably with rates of referral uptake reported in RCT-style Physical Activity Referral Scheme evaluations (23 – 49%, calculated as a proportion of the total sample of respondents to invitations to participate; Gidlow, Johnston, Crone & James, (2005)) and prospective longitudinal evaluations (43-79%; Harrison, McNair & Dugdill, (2005)). In comparison, Pavey et al. (2012) conducted a systematic review of levels of uptake and adherence in exercise referral schemes and found a pooled level of uptake of 66% across observational studies and 81% across RCTs. These findings are therefore higher than the WTB intervention uptake rate however, there was a high degree of statistical heterogeneity in the levels of uptake across the included studies.

In relation to adherence, of the 1678 participants who received their baseline health assessment, 64.5% (n = 1082) of participants went on to complete their second health assessment at three-months (primary comparisons). This also compares favourably with pooled level of exercise referral scheme adherence of 49% across observational studies and 43% across RCTs (Pavey, et al., 2012).

In relation to participant characteristics, a higher proportion of women took part in the WTB intervention and older people were more likely to begin and adhere to the intervention (as defined by attendance at three-month health assessment), which is consistent with findings from the systematic review by Pavey et al. (2012).

Analysis of the reasons for taking part in the project highlighted that 13% and 28.5% of participants stated that the financial incentive influenced their decision to take part ‘a lot’ or ‘a little’, respectively. This is congruent with the feedback received from participants during qualitative data collection. Participants also rated the pedometer (46%) and support provided by the intervention (90%) as influencing factors in their decision to take part (‘a lot’). Participants did not rate the town competition aspect

(61%) or the link to the Olympics (61%) as important factors in their decision to take part (reporting 'not at all').

The process evaluation, presented in Chapter 5, identified a distinction between individuals who were highly motivated by the presence of a financial incentive and those who were motivated by other intrinsic or extrinsic factors. In relation to the initial reasons individuals gave for participating in the WTB intervention, the incentive was perceived as either a primary or secondary factor. Those participants who identified the reward as a primary factor in their decision to take part ascribed a high value to the reward. In comparison, those who identified the reward as a secondary factor placed a low value on the reward. A number of individuals who held this view of the reward also perceived it as an 'extra bonus'. There were several additional perceptions held in relation to the reward. For example, for some participants the presence of a reward was a motivating factor. Others suggested that it provided something 'extra' to achieve in addition to the associated health benefits. Conversely, for other participants, the incentive was perceived as a reward for carrying out the practical aspects of the project (e.g., keeping a record of their daily steps), rather than a reward for improving their health.

In relation to the longer term perception of the reward, participants who returned for their subsequent health assessments at six- and 12-months (post three-month intervention) demonstrated that the reward was not a primary factor in their decision to continue in the project. This was highlighted in the case studies, presented in Chapter 6, whereby both participants reported not being influenced by the financial incentive.

The influence of rewards to change and modify behaviours is indisputable (Houlfort, Koestner, Joussemet, Nantel-Vivier, & Lekes, 2002). However, there is considerable debate whether rewards will have a beneficial long-term motivational impact. There are conflicting views on whether such, performance contingent, rewards will impact on intrinsic motivation and will encourage spontaneous, interest-driven behaviours in situations where the reward contingencies are no longer salient (Houlfort, et al., 2002). Evidence from the CET, described in Section 2.4.3, suggests that extrinsic rewards may have both enhancing and undermining effects on intrinsic motivation depending of the context in which they are presented (Deci, et al., 1999). Firstly, an extrinsic reward that is perceived as serving an information function (i.e. providing information relating to an individual's competence) may enhance intrinsic motivation. In contrast, if an extrinsic

reward is perceived to be controlling behaviour (i.e., the goal is to achieve the reward rather than engage in a behaviour for intrinsic reasons) then removal of the reward is likely to lead to a subsequent deterioration of intrinsic motivation and undermine the maintenance of behaviour. Within the WTB intervention, participants could perceive the reward as serving an information or controlling function depending on their overall goal of participation. For example, the level of reward received was contingent on participant health improvement over the intervention period. Therefore, participants may have perceived this incentive as controlling, especially if their goal was to achieve a reward. In comparison, the financial incentive could be perceived as serving an information function if it is viewed as providing information relating to their competence in performing a specific behaviour. The levels of reward associated with the WTB intervention may have protected against some participants perceiving the reward as controlling. For example, in order to receive the lowest level of reward (Bronze) participants were not required to make any health improvements, but were required to attend their second health assessment at three-months and submit their pedometer report card. This level of reward was therefore not contingent on performing the target behaviour, rather it was rewarding continued engagement. SDT, described in Section 2.4.3, argues that developing a sense of autonomy and competence are critical to the processes of internalisation and integration, through which a person comes to self-regulate and sustain behaviours conducive to health and well-being (Ryan, et al., 2008). The need for autonomy is related to the desire of individuals to choose their actions and feel that their behaviour is self-endorsed (Deci & Ryan, 2000; Ryan & Deci, 2000b). Therefore, it could be argued that because participants were able to receive a reward without performing the target behaviour, walking, they were able to self-determine their level of physical activity during the intervention period.

Conversely, qualitative evidence, presented in Chapters 5 and 6, suggests that, for a number of WTB intervention participants, an ‘over-justification’ effect may have been experienced (Deci & Ryan, 1985). This over-justification effect is based on the premise that the behaviour would have occurred anyway without the extrinsic reward and this was reported by a number of participants (Chapters 5 and 6). This effect also suggests that the presence of an expected reward causes a shift in perceptions from intrinsic to extrinsic and the behaviour is engaged in for reasons of receiving a reward rather than for intrinsic value. The resulting shift in perceived locus of causality is purported to mean that the reward ‘over-justifies’ the behaviour and, in the absence of the reward, a

reduction in intrinsic motivation in demonstrated (Biddle & Mutrie, 2007). However, whilst for some WTB participants this may have been the case, there is also evidence that for others this 'over-justification' effect was not experienced. Evidence for this is provided through the decision of participants to continue with the WTB intervention in the absence of the possibility of receiving a reward (post-intervention period of three-months). An explanation for this is that participants were more motivated by other intervention components, such as receiving a health assessment, which supports their intrinsic motivation for carrying out the desired behaviour. However, this explanation is provided with the acknowledgement that the number of participants completing six- and 12-month health assessments is markedly smaller than those who completed baseline and three-month health assessments.

Other research has reported the effectiveness of extrinsic rewards in encouraging individuals to initiate healthy behaviours (Volpp, et al., 2009). This research provides support for this as qualitative findings suggest that for some participants that the intervention, and incentive, was a 'kick start' for the initiation of behaviour change.

Similarly, a number of studies have also demonstrated that offering small extrinsic rewards, in the form of financial incentives, can increase enrolment (Almeida, et al., 2010). This is also supported by qualitative data with some individuals perceiving the financial incentive as a reward for completing the practical aspects of the intervention e.g., wearing a pedometer and recording daily step count. In addition, research has also demonstrated that small financial incentives can reduce disparities in recruitment by encouraging otherwise underrepresented groups to participate in physical activity interventions, thereby enhancing intervention reach (Almeida, et al., 2010; Mutrie, et al., 2010). In relation to the uptake characteristics of participants in the WTB intervention, when combined, a higher proportion of unemployed, retired and those looking after home and family were recruited compared with the wider Sandwell population make-up (57.7% vs. 28.7%, respectively).

Data suggested that financial incentives may promote participation in lifestyle physical activity through aiding intervention uptake. Participants who attached ***a low value*** to the impact of the incentive reported that they would have participated regardless of the incentive; the reward was viewed as a ***bonus.*** For such individuals other intervention components were likely to be the cited reasons for participation at baseline. In comparison, those who placed ***a high value*** on the incentive suggested that it ***was***

essential to their participation. Therefore, in the absence of a reward those participants who were motivated by the presence of an extrinsic reward would not have participated in this physical activity programme. However, other intervention components, such as health assessment and pedometer, were also likely to be important in promoting participation and uptake.

Therefore, as research from other countries suggest (e.g. Puska, Isokääntä, Korpelainen & Virtanen, 1998), financial incentives may promote participation in lifestyle physical activity for certain individuals. The present data suggest that the presence of a financial incentive was the primary motivator for a number of, but not all, individuals taking part in the WTB intervention. Others were likely to be motivated by other WTB intervention components, such as the health assessment and pedometer for monitoring of their behaviour.

2 a). To compare changes in health related behaviour (physical activity)

To evaluate the change in physical activity behaviour, participants were classified as being in one of five stages of change as identified by the TTM (Marcus, Rossi, Selby, Niaura, & Abrams, 1992b). This was the primary outcome measure. Primary comparisons demonstrated that stage of change classification was significantly higher at three-months compared to baseline and this represented a medium to large effect size (d = .63). This finding was replicated for secondary comparisons between baseline and six-month follow-up (d = .64). Post-hoc comparisons identified that stage of change at three-month follow-up was significantly higher than at baseline and this was also the case for stage of change at six-month follow-up compared to baseline. However, stage of change at three- and six-months did not significantly differ.

Although the distribution of change in physical activity stage of change showed a trend towards increased levels of physical activity from baseline to follow-up the largest proportion of participants were classified as being in the maintenance stage of the TTM. This was incongruent with the WTB aim to promote physical activity in the most sedentary and has implications for assessing intervention attributes, such as duration of intervention. For example, change in stage of change may suggest that the recruited participants were able to form habits in a 12-week period or were the most engaged because they were already situated far enough along the physical activity continuum.

However, the shift from being unlikely to engage in activity into higher stage of change categories to engage in activity, as found in the WTB, also provides support for the TTM. The use of the measure may be of value in developing approaches to promote an increase in population levels of physical activity as has been advocated elsewhere, for example, in North America (Marcus, Bock, Pinto, Napolitano, & Clark, 2002) and in Australia (Marshall et al., 2004).

Within the WTB intervention participants were encouraged to increase their lifestyle physical activity through walking. Participants were allocated a pedometer as a tool for monitoring such behaviour. At three-month follow- up, participants were walking, on average, between 4,500 and 6,000 steps per day over the intervention period (2.25 and 3 miles per day) (Bravata, et al., 2007; Hill, et al., 2003). Linking this with health implications it has been suggested that modest changes in physical activity, such as walking an additional mile (2,000–2,500 steps) per day, may be enough to prevent weight gain in an average adult (Hill, Wyatt, Reed & Peters, 2003). However, according to Tudor-Locke, Leonardi, Johnson, Katzmarzyk and Church (2011) approximately 7,000 steps per day have been estimated to be equivalent to meeting the physical activity recommendation of 150 minutes of moderate to vigorous intensity physical activity, accumulated in bouts of 10 minutes or more, per week. Therefore, on average, WTB participants were not reaching the recommended weekly levels of physical activity.

Individuals who took part in qualitative discussions suggested that they were situated at various points along the behaviour change continuum. In relation to the TTM, participants were identified as employing a number of the processes of change as recognised by Prochaska and DiClemente (1983). A proportion of participants stated that the WTB intervention changed their thought processes in that they were more likely to think about carrying out positive health behaviours. Participants provided evidence of the use of consciousness raising, self re-evaluation and stimulus control to achieve a change in their physical activity levels. In this instance participants illustrated that they were consciously aware of the causes and consequences of not participating in physical activity and as a result began to think about incorporating different tips and ideas of how to increase their levels of daily lifestyle physical activity.

Progressing from a change in thought processes to a change in behaviour, participants also provided evidence to suggest that they were employing a number of change

processes as identified within the TTM (Prochaska & DiClemente, 1982). For example, participants suggested that the pedometer was used as a method of stimulus control. Stimulus control involves removing cues for unhealthy habits and/or adding prompts for healthy alternatives. For some participants, the pedometer acted as a prompt to carry out physical activity. The pedometer was evaluated positively by the individuals taking part in the process evaluation. The pedometer was highlighted as a mechanism for self-monitoring, and awareness and goal setting in the maintenance of new and already established physical activity.

In relation to creating and maintaining habitual behaviour, a number of individuals stated that they were 'on the way' to achieving this goal or were confident in continuing to participate in physical activity when analysing their future intentions. This is supported by positive changes in a number of TPB subscales from baseline to three-month follow-up, including; behavioural intentions; perceived behavioural control; and attitude. This was replicated for the behavioural intentions and attitude subscales during secondary comparisons of data between baseline and six-month follow-up. Follow-up comparisons revealed a significant increase in the behavioural intentions and attitude subscales from baseline to three-month follow-up (but not baseline to six-months or three- to six months). This suggests that participant's intention and desire to participate in moderate physical activity in the future improved over the intervention period. There was an increase in participant's belief that they had the ability and were confident and capable of participating in moderate physical activity in the future. They also held a more positive attitude towards participating in moderate physical activity in the future. In comparison, no statistically significant changes occurred from baseline to six-month follow-up in perceived behavioural control and subjective norm subscales (TPB).

In addition to changes in physical activity related behaviour the process evaluation of the intervention provided evidence of its impact on other health related behaviours, specifically diet.

2 b). To compare changes in physiological measures of risk

The WTB intervention was successful in achieving statistically significant (α-level = 0.05) positive changes in a number of objective measures of health status at three- (primary comparison) and six-month (secondary comparison) follow-up compared to

baseline. However, significant improvements from three- to six-month follow-up were not seen in any outcome measure.

Evaluation of objective measures of health status demonstrated that the mean BMI significantly decreased from baseline to three-month follow-up. However, this was not replicated in secondary comparisons between mean baseline and six-month scores. Similarly, there was a statistically significant positive change in BMI classification between baseline and three-month follow-up, which was not maintained at six-months (Sections 4.3.5.3 and 4.3.5.7). This suggests that the intervention was successful in producing short-term changes in health status, as measured by BMI, but these were not maintained at six-months.

Mean WHR for both male and female participants decreased from baseline to three-month follow-up. This decrease in mean WHR was statistically significant. However this was only maintained at six-month follow-up for female participants. Again the mean waist circumference of participants decreased from baseline to three-month follow-up. This decrease was statistically significant for males and females. However, this statistically significant change was achieved at six-month follow-up for female participants only. In addition, a decrease was achieved in both mean systolic and diastolic blood pressure scores and this change was statistically significant from baseline to three-month follow-up (primary comparisons) but not maintained at six-month follow-up. Changes in blood pressure classifications from baseline to three- and six-month follow-up did not reach conventional significance levels.

The number of significant results found from primary comparisons between baseline and three-month follow-up for each outcome measure substantiates the use of physiological measures to assess change over a three-month intervention period. However, when comparing the effect sizes of these significant results between objective (physiological) and subjective (psychological) measures of health status, a difference is found. For objective measures, such as BMI and WHR, small effect sizes were found (d = .03 to .18). In comparison, for subjective measures, such as perceived health status (SF12v2, EQ-5D) small and medium to large effect sizes were found (d = .06 to .63). It may be more realistic to expect greater changes in subjective indicators and psychological outcomes over this relatively short intervention period. This may be particularly applicable in this intervention given that the target behaviour was walking rather than higher intensity physical activity. However, a possible explanation for the

significant changes in objective measures of health status found may be that participants were engaging in higher intensity activity other than/in addition to walking. The results from comparisons in subjective outcome measures are now reported.

2 c). To compare changes in perceived quality of life from baseline to follow-up

In relation to participants' perceived health status several subjective measures were taken. There was a statistically significant change in perceived health status, as measured by the EQ-5D visual analogue scale, from baseline to six-month follow-up. Follow-up tests identified a significant increase in perceived health status at three-months compared to baseline and also from baseline to six-month follow-up (but not three- to six-months). There was also a statistically significant positive change in the MCS of the SF12v2, from baseline to six-month follow-up. Post-hoc comparisons identified a statistically significant increase from baseline to three-month follow-up and from baseline to six-month follow-up (but not three- to six-months). Similarly, mean PCS scores significantly changed from baseline to six-month follow-up. Post-hoc comparisons found a statistically significant increase from baseline to six-month follow-up (but no baseline to three-months or three- to six-months). The results from these self-report measures demonstrate that over the intervention period there were significant improvements in participants' perceived health status. This finding is corroborated through qualitative discussions with participants as individuals referred to experiencing physiological and psychological improvements after taking part in the WTB intervention.

The main benefits that individuals attributed to WTB intervention participation, and therefore physical activity, were general health and well-being, and preventing the onset of illness and disease. An example of a positive outcome, of a physical nature, which was experienced by a number of participants, was improved mobility. In addition, a number of participants stated that taking part in more physical activity through the WTB intervention helped to bring relief from existing health problems such as arthritis. Similarly, participants identified that they became aware that their bodies were able to cope better with the demands of physical activity as their levels of activity increased. This demonstrates that participants perceived themselves as getting fitter.

In addition to positive physical outcomes, participants also reported experiencing a number of psychological benefits associated with taking part in the intervention. Positive psychological outcomes were mentioned in relation to *'the feel good factor'* and improving self-esteem and confidence. *'Feeling better in yourself'* was one of the most common reasons to emerge when participants were considering the benefits of taking part in the WTB intervention. Taking part in physical activity was perceived to contribute to a feeling of general well-being and acted as a tool for addressing negative thought processes, as a way of relieving stress and gaining the space and time to reflect.

Many participants regarded intrinsic factors of fun and enjoyment as major benefits of taking part in the WTB intervention. A positive experience was cited by a number of participants. Participants' beliefs seemed to suggest a *'wanting'* to participate in physical activity rather than perceiving it as a *'chore'*. Participants also stated that they looked forward to their next bout of physical activity. Experiencing a sense of achievement was also described by many of the participants who took part in qualitative discussions, presented in Chapter 5. This achievement acted as a motivator in continuing physical activity. If participants perceived an improvement then they seemed more likely to continue participating in physical activity into the future.

Findings from qualitative discussions relating to the perceived psychological benefits correlate with the well-documented benefits of physical activity, such as reduced stress and depression, increased emotional well-being, energy level, self-confidence and satisfaction with social activity (Biddle, Fox, & Boutcher, 2002; Mutrie, Biddle, Fox, & Boutcher, 2001).

3. To explore, using semi-structured interviews and focus groups, participants' experiences, attitudes and motivations towards physical activity, incentivised health schemes and WTB participation.

In order to address this objective a process evaluation was carried out to investigate the impact of the WTB intervention participation (Chapter 5). In addition, a mixed methods case study approach was used with the purpose of combining quantitative and qualitative research methods to investigate the longitudinal impact of participation in the WTB intervention (Chapter 6). The section reports key findings in relation to: initial

motivation for participation; motivating intervention components; and counteracting barriers to physical activity.

Initial Motivation

Research demonstrates that health, appearance, achievement and personal satisfaction are among the top reasons reported for engaging in regular physical activity (Frederick & Ryan, 1993). Results from the process and case study evaluation (Chapters 5 and 6) indicated that health benefits and the prevention of ill health and disease were main motivators for a proportion of individuals taking part in WTB. Participants were aware that physical activity was important for their health and, for some, health was the main motivating factor.

An alternative reason provided by some individuals for taking part in the WTB intervention was to gain knowledge about their own health status and to seek information and advice from health professionals that would help them to improve their health. Health information seeking is often perceived as a crucial step in the performance of health-related and preventive behaviours (Fahrenwald & Walker, 2003). Information seeking is identified as a significant factor influencing the extent to which individuals decide to engage in healthy lifestyles and/or preventive behaviours (Burbank, Reibe, Padula, & Nigg, 2002; Fahrenwald & Walker, 2003). Although information seeking and retrieval alone does not guarantee healthy behaviours, acquiring adequate information may motivate individuals to make positive changes in their health practices. An individual's health information seeking behaviour may influence knowledge about the pros and cons of different actions. The concept of gaining knowledge can be linked to the TTM construct of decisional balance. Decisional balance relates to a person's perception of benefits (pros) compared to negative aspects (cons) associated with the behaviour change (Marcus & Owen, 1992). Seeking health related information, including gaining knowledge of an individual's own health state and possible opportunities for change will aid decision making.

Additionally, the initial motivation for some participants was the use of the WTB intervention as a drive to change their own behaviour. Some participants saw the intervention as a method of encouraging and motivating a change in their behaviour, it *'gave me the push'; 'it was a kick start'*. The concept of drive was experienced by a number of participants and it seemed to play a significant part in initial motivation.

Individuals taking part in the WTB intervention demonstrated a desire to try and increase their levels of physical activity.

As previously mentioned, a small number of participants reported at baseline that the financial incentive was one of the main reasons for their participation. Some participants were honest in their revelation that the chance to receive an extrinsic reward ultimately had an impact on their decision to take part. For such individuals, the reward was a primary factor in their decision to take part in the WTB intervention. Whereas, for other participants, the reward was not a factor in their decision to take part, the reward was very much a secondary feature of the WTB intervention. The financial incentive, although useful for aiding uptake for some individuals, it was perhaps less important than health as an initial motivator for others.

Motivating Intervention Components

One component which was consistently highlighted as a powerful motivating tool was the pedometer. It was seen as a vehicle for self-monitoring of physical activity behaviour, gaining awareness of current physical activity levels and for goal setting. These three mechanisms were identified as being motivators for physical activity and modifying physical activity related behaviours. Devices, such as pedometers allow individuals to self-monitor their own behaviour. Self-monitoring procedures have been successfully employed in a number of behavioural interventions targeting increases in physical activity, often as part of a multi-component intervention (Tudor-Locke, Ainsworth, Thompson, & Matthews, 2002a). In this intervention, the pedometer enabled participants to set themselves a goal or target for a particular period of time, such as a specific day or on average over the week. The pedometer allowed participants to keep a record of their goals and progress towards them.

In addition, one of the most commonly cited motivators was the health assessment. Many participants suggested that having health related measures, such as, body weight and blood pressure taken by a trained assessor, helped to sustain their motivation throughout the intervention period. This concurs with the findings of Hillsdon and Thorogood (1996) that regular follow-up increases the likelihood of sustained behaviour change. There are significant benefits to encouraging belief in an individual's ability to have an influence on one's own health in terms of adherence to such behaviour change interventions. An intervention such as WTB is a useful forum which provides the

opportunity to give feedback that could demonstrate the effectiveness of one's own actions in improving health. Regular feedback on progress, through health assessments, may help to internalise health related locus of control and self efficacy and to encourage continued participation in activities (see Sections 2.2.1 and 2.4).

The practical aspects of the health assessment were also reviewed positively. The ability to attend a health assessment was identified as an important component of the WTB intervention. Participants frequently mentioned that the health assessment provided an opportunity to have a health check in a less formal, more interactive and more accessible setting than visiting their local general practitioner. The use of a non-clinical, community setting, was popular with participants and allowed the intervention to reach those less inclined to use primary care; perhaps as a result of being unaware of existing health problems (e.g., hypertension), or because of reticence to seeking professional medical care (e.g., men vs. women). This mode of delivery enabled the identification of potential health issues, provided the necessary catalyst to seek medical advice, in addition to promoting lifestyle behavior change.

Other participants suggested that the reward itself was an extrinsic motivator, it was a *'goal to aim for'* and it provided something to achieve over and above the possible health benefits. Participants related the reward to effort. The existence of a reward encouraged some participants to put more effort into increasing their levels of physical activity than they otherwise would.

In comparison, both case study participants, Kate and Julia, stated that they were not influenced by the opportunity to receive a financial incentive and instead viewed the pedometer and health assessment as motivating intervention components. However, they both recognised that the incentive may be an attractive intervention component for others and that this may be moderated by employment and level of income. This therefore for suggests that the relative importance of each individual component varies. For some, the financial incentive was not as motivating, if motivating at all, as other intervention components, such as the health assessment and pedometer.

Counteracting Barriers to Physical Activity

During qualitative discussions a number of barriers to physical activity were highlighted and some participants identified WTB components which helped them to overcome them.

The majority of participants in the WTB intervention felt confident in their ability to walk and therefore, to incorporate physical activity into their daily lives. Qualitative discussions highlighted that participants had high walking-related self efficacy. Marshall and Biddle (2001) describe self-efficacy as "the confidence that an individual has for performing a particular behaviour in challenging or tempting situations" (p. 229) (Section 2.4.1). Exercise self-efficacy is therefore the degree of confidence an individual has in his/her ability to be physically active under a number of specific/different circumstances, or in other words, efficacy to overcome barriers to exercise (DuCharme & Brawley, 1995). Self efficacy is an important factor in physical activity participation, and is identified as a predictor of uptake (Biddle & Mutrie, 2008) and adherence (McAuley, 1992).

Walking is widely promoted as a form of activity for a variety of reasons, including its ease and convenience and its association with positive health outcomes, regardless of intensity (Ogilvie, et al., 2007). Within the WTB intervention walking was considered to be a versatile activity that was easy to perform and suitable for all age groups. Walking was also noted as an activity with little associated cost and therefore an accessible activity for all individuals. It was also seen as a way of benefiting from being outdoors, taking in fresh air and was regarded as a lifestyle activity. The accessibility of walking as a form of activity was also important for participants whose health would normally be a barrier to carrying out physical activity; so the nature of the activity as well as the method of promotion was important for success in WTB.

Existing health problems were identified as an important barrier to increasing physical activity levels. The symptoms experienced by participants presented a real barrier to participation in certain activities and the frequency in which the individual could take part in physical activity. This is in comparison to the positive outcomes experienced by some participants in terms of alleviating symptoms associated with existing health problems, such as arthritis. However, within this intervention, the majority of participants reported confidence in their own ability to walk and, by implication, to incorporate physical activity into their daily lives. Participants who experienced health limitations as a barrier to physical activity found that walking as a form of activity was something that they could realistically undertake. In contrast, others individuals felt that walking was not challenging enough.

Participants often cited a busy lifestyle and varying responsibilities as the main factors influencing their participation in physical activity. The combination of work and family responsibilities were major contributing factors to a lack of time for involvement in physical activity. An example of this was presented in the case study of Kate. When any time was available participants stated that there were competing demands for its use, they were either '*too tired'* or lacked the motivation to expend more energy taking part in physical activity. In addition to a lack of time due to the demands of their employment, a number of participants identified that the pressures of work and the actual type of work being undertaken, i.e. a sedentary versus active job, were significant barriers to increasing their physical activity levels (Reichert, Barros, Domingues, & Hallal, 2007). Despite such barriers, participants highlighted that walking as a lifestyle activity was a *'good idea'*. The lifestyle approach is one way of addressing both time and access barriers to physical activity as it promotes lower-intensity physical activity, such as walking, that can readily fit into a daily routine. The lifestyle approach also incorporates multiple bouts of physical activity to achieve daily goals rather than concentrating an entire day's commitment to a single session (Dunn, et al., 1998). The approach reduces the need for blocks of time and special facilities for physical activity participation. This approach may also be perceived as less intimidating to individuals who have either no experience or unpleasant prior experiences of physical activity (Ogilvie, et al., 2007). The promotion of walking as a lifestyle activity was viewed positively by those taking part in the WTB intervention. Walking was viewed in a positive manner as participants suggested that it is an activity that they could fit into their daily life rather than having to commit a particular portion of time to exercising. For individuals with a busy lifestyle it was easier to incorporate walking into their daily routine rather than finding time to go to the gym, for example, and participants seemed to value walking as a form of exercise.

The need for support from significant others and peers emerged as an important theme for the majority of participants. This need was more frequently expressed by women who said that support regarding child minding and housework was an enabling factor for physical activity. They also felt that a positive attitude towards activity on the part of spouses, children and significant others was supportive (Kahn, et al., 2002).

Most participants said that they enjoyed company when doing an activity and liked to plan activities with others, such as, walking with friends and neighbours and this was

viewed as motivating. Women, more than men, stated that they often walked in groups with friends and / or family, and this provided support and encouragement to take part in physical activity. This is consistent with evidence linking social support and physical activity (Section 2.2), such that individuals who engage in regular exercise report receiving more support for activity from people in their home and work environments (Hovell, Sallis, Hofstetter, Spry, Faucher & Caspersen, 1989).

In addition, exercising with others served as a strategy for overcoming issues of personal safety which were sometimes identified by participants as possible barriers to participation in physical activity (Foster, Hillsdon, & Thorogood, 2004). This was particularly in relation to the use of public spaces, such as local parks. Participants described how they could overcome this barrier by exercising with others. Similarly, walking as a form of activity allowed social interaction with other members of the community. Simply walking outside in the community where participants could meet people and keep in touch with people enhanced the social benefits for some individuals. This relates to findings from Kuo (2003) suggesting increased social interaction among adults in the natural environment promotes a greater sense of safety.

Longer Term Impact of WTB Intervention Participation

The longer term impact of WTB participation was assessed through four case studies, two of which were presented in Chapter 6. Evaluation of objective and subjective measures of health status and levels physical activity suggested that Kate was already active at baseline and engaging in some form of activity on most days of the week. In comparison, Julia was in the preparation stage of the TTM at baseline and was not taking part in regular physical activity. At baseline, Julia had a poorer health status when compared to Kate. At the end of the intervention period (at three-months) both Kate and Julia made improvements to their health status (objective and subjective), with Julia demonstrating greater improvements. This suggests that those with poorer health outcomes at baseline will benefit most from participating in the WTB intervention. For both case study participants the largest degree of improvement was found between baseline and at three-months, i.e., pre- and post-intervention. This is consistent with findings from the outcome evaluation of the WTB intervention (Chapter 4).

For Kate, the WTB intervention served as a tool for maintaining her levels of physical activity, which is consistent with her qualitative reports. It is therefore unsurprising that

her measures of health status either improved or were maintained from three- to 12-months and this is commensurate with her position in the maintenance stage of the TTM. Her average daily step-count over the intervention period also suggested that she participates in the recommended amount of physical activity, according to government guidelines.

On the other hand, for Julia, the WTB intervention served as a motivator to initiate behaviour change. This is supported by her stage of change position at baseline (preparation) compared to three-month follow-up (action). The largest improvement in Julia's health status was also found over this period. However, this level of improvement was not sustained for all measures of health status at six- and 12-months. Nonetheless, the majority of health status measures remained above baseline levels at 12-month follow-up. This variable change in health status measures may also be related to Julia's change in stage of change, which at six-months returned to the preparation stage and this was maintained at 12-months. Research suggests that movement through these stages often occurs in a cyclical, rather than linear pattern (Marcus, et al., 1996) which may explain the variable changes in health status from baseline to 12-months. Julia's average step-count over the intervention period also suggested that she was not yet meeting the recommended amount of physical activity, according to government guidelines.

The continued engagement of case study participants at the 12- month time period was a marker of their 'genuine interest' in the intervention. Julia stated that this is in comparison to 'others' who may be lacking in motivation or interest and therefore would not have reached their 12-month health assessment. This also demonstrates that the financial incentive was not a key motivating factor in Kate and Julia's continued engagement with the intervention.

7.4 Strengths and Limitations of this Research

This section reports the relative strengths and limitations of this research in light of the 'real-world' nature of this research.

7.4.1 Strengths

This research is the first to conduct this type of mixed methods evaluation of a financial incentive scheme to promote physical activity using a combination of quantitative, qualitative and longitudinal case study methods to provide an in-depth and detailed account of findings. This research design allowed for the triangulation of findings to establish the consistency of the results, clarify the findings from one method to another, and provide new insights and depth to the findings (Greene, Benjamin, & Goodyear, 2001). Individual evaluation components provided information relating to *'if', 'why' and 'how'* the WTB intervention impacted participant outcomes at various time points (three-, six-, and 12-months). Notwithstanding the limitations of any single individual data source and the restrictions of research in a 'real-world' setting, the rich data presented provided a robust and comprehensive picture of the programme in terms of impact and participant experience. As such, mixed methods optimally involve the combining of methods that have complementary strengths and non-overlapping weaknesses (Johnson & Turner, 2003). For example, the case studies were limited in their generalisability, but the information gathered helped to further explain results from quantitative investigations.

This is the first time this evaluative approach has been applied to this type of physical activity intervention. This research makes an important contribution to the area, identifying some important next steps for research, aside from the changes to practice that resulted from this work.

7.4.2 Methodological Issues and Limitations

The evaluation of the WTB intervention indicated positive outcomes, both in terms of objective and subjective measures of health status. In addition, qualitative investigations highlighted that overall the program was viewed positively by participants. However, the potential limitations to the presented findings need to be considered. Limitations are considered in relation to each evaluation component with reference to the overall intervention design: the outcome evaluation; the process evaluation; and case study approach.

7.4.2.1 WTB Outcome Evaluation

Firstly, the experimental approach used in this intervention study limits the ability to draw causal inferences from the data. This is especially due to the lack of control or comparator group. The feasibility of the inclusion of such a group was discussed with Sandwell PCT, but an appropriate solution was not identified. It would have been very difficult to ensure that intervention components only reached the intended audience when the control/comparison group would have been located in the same geographical area. On the other hand, lack of a control group meant that it was not possible to isolate the impact of the financial incentive and disentangle the relative components of the intervention. A pragmatic approach was therefore taken in the evaluation of WTB.

Outcome Measures

A further limitation may be the use of the TTM stage of change questionnaire as an outcome measure. Within this WTB sample, the largest proportion of participants fell within the maintenance stage of the TTM despite the baseline health status of participants painting a different picture. This may have been due to a problem with participant interpretation of the measurement tool, which was developed by Marcus, Rossi, Selby, Niaura and Abrams (1992). However, other studies have demonstrated the questionnaire's reliability (Marcus, et al., 1992b) and its validity has been demonstrated within a British population (Wyse, Mercer, Ashford, Buxton, & Gleeson, 1995). It is possible that there were issues with interpretation of 'regular, moderate physical activity' even though examples were provided (e.g. brisk walking and cycling). In addition, the definition of time frames that are required to classify an individual in a particular stage of the TTM may not have been strictly adhered to. This therefore may have had an impact upon the stage classification of participants and it may be the case that they had placed themselves in a higher stage of change that did not represent their actual levels of physical activity.

An alternative explanation in relation to the number of participants who were classified in the maintenance stage of the TTM is that the project attracted individuals who were already active. This would have been in conflict with the programme aims to engage those individuals who are sedentary and who would not normally be interested in the services offered by Sandwell PCT, i.e. those who are in the contemplation and preparation stages of the TTM. Similarly, there may have been issues relating to social

desirability bias leading to over reporting of physical activity participation and stage of change.

Given the 'real-world' nature of this research there were limitations in relation to what evaluation methods could be implemented. For example, the health assessment was required to be completed within a 30 minute time frame and therefore the outcome measures selected needed to be sufficiently short and suitable for collection via face-to-face methods. The stage of change questionnaire was therefore, in one sense, an ideal measure to include as it was short and straight forward. Similarly, there needed to be a sufficient number of outcome measures included to ensure that an assessment could be made in relation to the allocation of financial incentives. The criterion for each level of reward (bronze, silver, gold) was related to the level of health improvement over the intervention period. Results from the outcome evaluation of the WTB intervention suggest that the reward criteria may have been too sensitive to change which resulted in all participants receiving either a silver or gold reward. This is further discussed in Section 7.6.

Participants were required to monitor and record their daily step counts and although pedometers correlate strongly with time in observed activity (Tudor-Locke, et al., 2002b) accelerometers could have been used to validate self reported step counts, for a sub-group of participants.

Data Collection

The outcome evaluation of the WTB intervention was completed using secondary data collected by health assessors employed by Sandwell PCT. Data collection was organised and managed by Sandwell PCT's Physical Activity Team. The researcher was therefore reliant on WTB project workers to collect questionnaire data and physiological measurements. Health assessors were recruited from the local area and all had prior experience of conducting health assessments and collecting physiological measurements via GP referral schemes. Prior to data collection all health assessors participated in a training workshop in order to standardise the delivery of the WTB assessments. This was also facilitated through the use of a guidance pack consisting of information regarding the order in which measurements and data were to be collected, and 'cue cards' explicitly stating what was to be relayed to the participants by the health assessors. The researcher also participated in observations of health assessments for data

assurance purposes. Through these observations it was discovered that the original evaluation design was not being delivered as intended, in relation to the advice provided to participants. Following this, as described in Section 4.2.1, discussions took place with Sandwell PCT's Physical Activity Team and it was decided to employ a one group, pre-, post-intervention design as there was no distinction in intervention delivery between the two groups. This had methodological implications.

7.4.2.2 A Process and Case Study Evaluation

Qualitative aspects of the WTB intervention evaluation were designed pragmatically through collaboration between the researcher and Sandwell PCT's Physical Activity Team. Qualitative data collection was required to complement the delivery of the WTB intervention and the collection of quantitative data. This was to ensure efficient use of Sandwell PCT's resources and to reduce participant burden. Limitations are considered in relation to a process evaluation of WTB intervention participation and a case study approach to investigate the longer term impact of the intervention on two individuals.

One limitation of the qualitative aspects of this study is related to participant recruitment. Participants were invited to take part in semi-structured interviews immediately following their follow-up health assessment at either three- or six-months (process evaluation) and three-, six- and 12-months (case study approach). Participants were therefore 'self-selected', with the exception of random selection at three-months, which raises issues relating to selection bias. It was not possible to collect qualitative data from those who had dropped out of the intervention after receiving their baseline health assessment. On reflection, alternative methods for collecting information from individuals who had dropped out could have been considered, for example, the distribution of a postal questionnaire. However, the likelihood of a poor response and workload implications for Sandwell PCT's Physical Activity Team precluded this option.

Qualitative data collection for the development of individual case studies was essentially an extension of the process evaluation in relation to the procedures followed. Participant recruitment for the case study involved identifying individuals who had completed their baseline, three- and six-month health assessment, in addition to receiving a semi-structured interview at either three- or six-months. Therefore the pool from which participants could be selected was relatively small. In addition, participants

who agreed to take part in a 12-month health assessment and follow-up interview were likely to represent those who viewed the intervention positively, given their continued engagement. This, along with the nature of case-study research impacts upon the generalisability of results.

7.5 Future Research

This research has provided evidence for the effectiveness of participating in an intervention comprising a health assessment, pedometer, brief health advice and a financial incentive delivered in a community setting. Changes in behaviour (physical activity) and health status were found at six-month follow-up. This research suggests that for some individuals, financial incentives may promote participation in lifestyle physical activity, potentially through aiding uptake and sustaining engagement. However, other intervention components were likely to be important for the overall effects observed. A number of questions remain and require further research. Firstly, robust, well controlled, evaluation designs are required to establish the relative impact of financial incentives and disentangle their influence from other intervention components. There are a number of attributes of financial incentives that require further investigation in order to ensure that they can serve as sufficient motivation for use as rewards, such as amount, frequency and method of administration.

In addition, the optimum incentive-based approach needs to be established. For example, it is not yet known which population group would benefit most from financial incentives. There may not be an optimum target group, however, this evaluation of the WTB intervention suggested that some individuals may benefit from participation more than others. For example, the case study participant with a poorer baseline health status demonstrated a greater health improvement post-intervention (three-month follow-up) compared to the case study participant with a better baseline health status. However, the relative contribution of the financial incentive, compared to other intervention components is not known. Similarly, it may be that those most in need of physical activity advice have the lowest uptake and adherence, and thus physical activity promotion schemes could run the risk of increasing health inequalities if not targeted to the most sedentary (Goddard & Smith, 2001; Panter, Jones, & Hillsdon, 2008). Related to this is the question of whether the effects of financial incentives differ among

socioeconomic groups. Within WTB the majority of participants were White British and from a largely deprived area. There is a limited evidence base relating to the impact of financial incentives on socioeconomically and ethnically diverse populations that could contribute to our understandings of how to optimise the use of financial incentives.

Finally, the question regarding the long term impact of financial incentives in the maintenance of positive health behaviours remains unresolved and requires further research. Within the WTB intervention it was only possible to investigate the longer term impact of the intervention for a small number of case study participants. This therefore has implications for the generalisation of results collected using this approach. However, it was beyond the resources of the WTB intervention delivery to assess long-term impact in large numbers of participants.

7.6 Recommendations for Practice

This section considers the recommendations that emerged from the findings of this research and are presented in relation to how they were identified; through quantitative or qualitative evaluations.

7.6.1 Recommendations: Quantitative Evaluation

A number of recommendations arose from the outcome evaluation of the WTB intervention and were presented to Sandwell PCT:

1. To ensure that the WTB intervention is targeted to the right audience. The WTB intervention targeted the general population and did not stipulate any inclusion criteria relating to participant health status or physical activity level. Targeting the WTB intervention to those who would benefit most from participation in physical activity (i.e., the sedentary) to maximise health benefit and efficient use of resources should be considered. This was also supported by suggestions gathered through qualitative data collection (see Section 7.6.2).

2. To review the criteria relating to each level of the reward. All participants received either the Gold or Silver award, meaning participants improved in at least one outcome measure. Suggestions for potential changes included; (1) replace the current

silver award criteria with the bronze award and change subsequent silver and gold reward criteria to make them more difficult to achieve, or (2) weight different outcomes measures in change calculations for identifying level of reward. For example, place a greater weight on outcome measures that are harder to achieve in a three-month intervention period, such as BMI. This relates to incongruent results that were found between objective and subjective measures of health status. Objective measures indicated a poor health status, whereas subjective measures indicated good health status (when compared to national norms).

3. To review existing outcome measures and explore potential additions or replacements. For example, removal of the collection of WHR as currently, small changes in either waist or hip measurement (whether that is through change or measurement error) resulted in individuals being credited with an improvement.

4. To explore the potential for participation beyond six months.

7.6.2 Recommendations: Qualitative Evaluation

Although participants generally provided positive comments regarding the WTB intervention, some critical and constructive analysis was provided. Subsequently, a number of recommendations were identified through qualitative evaluations and presented to Sandwell PCT:

1. To ensure that interventions are targeted to the right audience; a number of participants felt that the project should be specifically targeted towards those who are sedentary in order to be the best use of public funds. A number of participants identified that being rewarded for something that they would have done any way was not the most appropriate population group to target. However, individuals who expressed this particular view also highlighted that they could see how a person could gain benefits from participating in the WTB intervention regardless of physical activity level.

2. To provide written feedback to participants relating to their health assessment. This could be sent to their address after each health assessment.

3. To provide additional support and feedback during the three-month intervention period; either face-to-face (intervention staff or other participants), or through

newsletters and phone calls. There is evidence to demonstrate that social support and reinforcement can have a positive effect on adherence and intervention outcomes (Wing & Jeffery, 1999).

4. To introduce a mentoring system/peer interaction; a number of participants felt that it would have been beneficial to have had structured contact with other WTB participants to 'give you a bit extra motivation'. Interacting with individuals who may be in the same position in terms of levels of motivation would, in their opinion, provide additional support and feedback during the intervention period.

5. To develop the health assessment further; some participants felt that the health assessment was a lost opportunity to provide more tailored, individual advice.

6. To evaluate the level of reward; looking back some participants expressed the opinion that the reward was overly generous, however, they also identified that the absence of a reward may have meant that a number of individuals would not have participated in the intervention.

7. To advertise and promote the intervention more effectively; throughout discussions one of the most common criticisms was that the project needed to be advertised and promoted more. Some participants felt that awareness of the project was low and that there were many more people who could benefit from the project if they knew about it. They felt that a lot of promotion occurred through word of mouth with current participants trying to encourage family, friends and colleagues to sign up for the intervention. Suggestions for possible mechanisms for promotion were adverts in the local newspapers and local radio.

7.6.3 Implementation of Recommendations

The feasibility of each recommendation was evaluated by Sandwell PCT and a number of changes were made during the second delivery of the project. The second iteration of the project was called "Walk 2: Beijing to London" (Appendix 21) with the aim of capitalising on the London 2012 Olympic Games.

1. The recommendation for providing social support to participants during the intervention was also taken on board as the Physical Activity Team aimed to recruit

participants from existing community groups and to deliver the intervention in group settings.

2. The new programme also incorporated an additional incentive for those who made longer-term health improvements at 12-months. This incentive was to the value of £15 in high street and grocery vouchers.

3. The Sandwell PCTs Physical Activity Team also reviewed their advertising strategy in response to participant feedback summarised in this qualitative investigation. In addition to word of mouth, the team utilised the local transport system to advertise the new programme with large adverts placed on the sides of buses servicing local routes throughout the city.

4. Participants also received written feedback, via post, relating to their health assessment.

7.7 The Role of the Researcher

The researcher and supervisory team at Staffordshire University had input into the design of the programme within the constraints and resources provided by Sandwell PCT. For example, ideally the intervention would have been delivered to participants who were randomly allocated to an intervention or control group with and without the inclusion of a financial incentive. However, discussion with Sandwell PCT established that this was not feasible. Sandwell PCT developed the basic intervention protocol i.e. the use of financial incentives and their subsequent value, the use of pedometers, the imparting of health advice and the delivery of the intervention through health assessments.

The researcher and the project team at Staffordshire University were responsible for the development of the outcome and process evaluation framework. This role involved identifying appropriate outcome measures (some of which were stipulated by Sandwell PCT) and subsequent timescales for evaluation, within the parameters set by Sandwell PCT. Additionally, it was the researchers' role to identify appropriate resources and materials to evaluate the identified outcome measures. Discussions took place between the project team and Sandwell PCT to establish a consensus in the development of the

evaluation framework in order to meet the constraints placed on the project. For example, the intervention needed to be delivered and data collected within a 30 minute health assessment. Therefore consideration was required in terms of the length of time it would take to complete any evaluative materials or resources. The development of the evaluation framework was central to the assessment of individual change over the three-month intervention period. This subsequently informed the value of the reward given to participants. The researcher developed the entire protocol for the process evaluation of the WTB intervention and case study approach. This involved identifying suitable time frames for evaluation, developing interview schedules from the conduction of pilot focus groups, conducting semi-structured interviews and focus groups over a 12-month time frame and identifying an appropriate methodology for analysis.

7.8 Researcher's Reflections

7.8.1 Introduction

Given the nature of this research, it is important to reflect upon how my background, interests and insight from evaluating a 'real-world' programme using financial incentives to promote walking as a lifestyle activity influenced this thesis. Reflective practice is increasingly recognised as an important process (Ghaye, 2000) and "urges us to explore the ways in which a researcher's involvement with a particular study influences, acts upon and informs such research" (p. 228) (Nightingale & Cromby, 1999).

I came to undertake this PhD with the knowledge that the original research question and intervention design pre-existed. Therefore, from the start I understood that development of the research design and selection of the data collection method would be constrained and driven by the requirements of Sandwell PCT. The aim of this research was to examine the benefits of a scheme that offered a financial incentive to promote positive health behaviours, specifically physical activity. The scheme was developed, managed and delivered by Sandwell PCT and therefore, as a researcher involved in the evaluation of this scheme, it was important to establish a good relationship. The advantage of developing a rapport with the Sandwell PCT's Physical Activity team was that it allowed me to be an 'insider researcher' which greatly improved my understanding of this 'real-world' project. I was able to gain insights into the pragmatic issues relating to

the delivery of health promotion programmes, which subsequently influenced the research design. My knowledge and experience of qualitative research also influenced my approach to the design of this research; however, it was ultimately driven by the practicality, suitability and relevance to the specific research environment. This was particularly important as the recruitment of participants was facilitated by Sandwell PCT and therefore collaboration was required to come to a decision regarding the research design that was both pragmatic and maintained scientific rigour.

Reflection is commonly recognised as an essential component of the research process requiring recognition and awareness of the researcher's position and role in the process of data collection and analysis (Willig, 2008). Throughout the research process, a hand written journal was kept to aid reflection. It served as a useful tool in both encouraging reflection-in-action (during the research process) and reflection-on-action (post-research) (Schön, 1983). As described in Section 3.4, the evaluation of the WTB intervention comprised analysis of: quantitative data on participant outcomes (Chapter 4); qualitative data exploring both participant outcomes and processes (Chapter 5); and in-depth case studies of two individual's using a mixed-methods approach (Chapter 6). The role of the researcher, presented in Section 7.7, illustrates the contributions made by the researcher to the development of each evaluation component in addition to a number of constraints stipulated by Sandwell PCT. This section reports the researcher's reflections of each evaluation component with reference to the researcher's role in their completion. As a reflection of the researcher's influence on the research, and how the research has developed as a result of the doctoral process, this section is written in the first person.

7.8.2 Reflections: The Outcome Evaluation

This section reports my reflections of conducting an outcome evaluation of the WTB intervention.

7.8.2.1 Research Planning

This element of the WTB evaluation was where I could exert the least influence. As previously stated, I became involved in this research once the research question and intervention had been established and developed. Ideally, the design of the intervention would have involved the randomised use of financial incentives between an intervention

and a control group (no incentive). However, this was not possible due to constraints relating to resources and the implication of delivering the intervention (and control group) in the same geographical area. As I was relatively inexperienced in working with external partners in a real-world setting at the start of this PhD it was difficult to understand the extent to which you should try and 'push' for certain evaluation components to be included. However, as I knew that the intervention design and delivery structure had already been developed from the very beginning it was easier for me to approach this outcome evaluation in a pragmatic way.

The evaluation of the WTB intervention was conducted using secondary quantitative data collected by Sandwell PCT. The data collected during the intervention delivery, via health assessments, served two purposes: (1) to measure subjective and objective changes in health status for individual participants to establish the level of financial incentive to be rewarded; and (2) to compare changes in health related behaviour (physical activity), physiological measures of risk, and perceived quality of life from baseline to follow-up. Therefore, the evaluation outcome measures were directly informed by the content of the WTB intervention.

7.8.2.2 Data Collection

Quantitative data was collected by health assessors, employed by Sandwell PCT. As mentioned previously, issues relating to the integrity of intervention delivery were identified. Both Sandwell PCT and I were keen for me to experience the delivery of the intervention 'in the field'. Consequently, Sandwell PCT organised for me to observe a number of health assessments, with the participants consent. It was during these observations that I identified that the intervention wasn't delivered as was intended in relation to the level of advice provided to participants. I discussed this finding with my supervisor (RD) before organising a meeting with Sandwell PCT to discuss this issue. Collectively, we agreed to conduct the evaluation using a one-group, pre-, post intervention design. Although this was not the ideal situation to be in, it demonstrated how crucial it was to undertake checks for the integrity of intervention delivery when you are not in control of or collecting primary data in research.

Data was also collated, stored and inputted into a database by Sandwell PCT. This had advantages and disadvantages. On the one hand, I did not have to carry out this onerous task but on the other hand it meant I had less control over how data was collated. In

order to guide this, I developed a database template that Sandwell PCT could use for organising the data for each participant over (potentially) multiple time frames. However, in practice this was not used and this therefore had implications for the tasks I had to undertake in organising and cleaning the data for analysis. The biggest problem in relation to this was that individuals responsible for data input had treated each row in the database as one time point. This meant that participants who had undergone more than one health assessment had multiple rows of data rather than a single row. At the start this seemed like an impossible task given that 1678 and 1082 participants had taken part in baseline and three-month health assessments, respectively. However, with help from a colleague with a little more excel 'know how' we were able to write a script in order to automate the process. This experience has taught me the importance of continual checking of the data collation process when you are not doing it yourself.

7.8.3 Reflections: The Process Evaluation and the Case Study Approach

This section focuses on my reflection of completing the process evaluation and case study analysis of the WTB intervention. I was able to exert the most influence on these evaluation components and this section summarises my reflections relating to: planning the research; recruitment of participants; data collection; analysis of data; and write-up of results.

7.8.3.1 Research Planning

The purpose of the process evaluation, presented in Chapter 5, was to add depth to the quantitative research presented in Chapter 4. The aim was to explore participants' experiences, attitudes and motivations towards physical activity, incentivised health-promotion schemes and for WTB intervention participation. The design of this process evaluation was developed pragmatically through discussions between myself, my supervisor and Sandwell PCT's Physical Activity Team. I was aware of the importance of reducing participant burden and the use of resources in the delivery of the intervention. Therefore, we aimed to align qualitative data collection with the delivery of the WTB health assessments. One-to-one, semi-structured interviews were selected as the preferred method of data collection as they could complement the quantitative data collected by health assessors, employed by Sandwell PCT. Thematic Analysis was

identified as particularly suited to the research question (Section 5.1). Semi-structured interviews allowed participants to articulate their experiences and the use of an inductive, exploratory method of analysis from an essentialist and realist perspective ensured that the findings were representative of the participant's experiences.

Similarly, the development of the case study approach was driven by pragmatic factors associated with the design and delivery of the intervention. The case study approach was used with the purpose of combining quantitative and qualitative research methods in order to investigate the longitudinal impact of participation in the WTB intervention. Essentially, the case study approach was an extension of the process evaluation in terms of the qualitative data collection methods and the procedure followed. This qualitative data was used in conjunction with quantitative data collected as part of the outcome evaluation of the WTB intervention (Chapter 4). Data collected via semi-structured interviews at six-months (Chapter 5) were re-analysed using Interpretative Phenomenological Analysis (IPA) and additional qualitative data were collected by the researcher at 12-months. I felt that both the process evaluation and case study approach aligned well with the quantitative data collection. At no point did I feel that I was placing additional burden on the health assessors or Sandwell PCT. For example, participants were invited to take part in semi-structure interviews in the same letter which invited them to undertake a health assessment at a particular time point. This ensured that I collected primary data from participants whilst ensuring the efficient use of Sandwell PCT resources.

7.8.3.2 Participant Recruitment

The process of recruiting participants was facilitated by members of the physical activity team at Sandwell PCT. Participants were invited to take part in semi-structured interviews immediately following their health assessment at either three- or six-months (process evaluation) and three-, six- and 12-months (case study approach). Qualitative data collection took place in community locations across Sandwell and all participants were familiar with the settings. I facilitated all semi-structured interviews and focus groups and was therefore required to travel to a variety of locations. Initially, I was apprehensive as I was unfamiliar with the area and data collection sites; however upon my first visit to each location I arranged to meet the health assessor. This enabled me to familiarise myself with each site before conducting any data collection. I felt that this was essential as it helped me to prepare for data collection, ensuring that each location

was suitable. Although individuals were offered an incentive to take part in an interview, in the form of a £10 gift voucher, as a researcher you cannot predict how many people will attend. In an attempt to ensure that enough data was collected we decided to over-sample. I felt that this was necessary as it took time to organise interviews and provide enough notice to participants as interviews were scheduled at least four-weeks in advance. There were only a few occasions when individuals were unable to or decided not to attend their scheduled interview, which had subsequent consequences in relation to the amount of time I spent transcribing interview data. However, the relatively large sample size meant that I was able to build up a comprehensive picture of the impact of WTB participation. I felt that the organisation of data collection worked well, I was mindful that I was conducting 'real-world' research and therefore wanted to 'fit-in' with existing structures. For example, participants were invited to attend an interview in the same way that they were invited to their follow-up health assessment. In an attempt to reduce participant burden, interviews were conducted immediately after the individual had received their health assessment in a location that was easily accessible. In the majority of cases this method of recruitment went smoothly, however, on a few occasions it did not go to plan. Four focus groups were completed when more than one WTB participant was present at the same time. This most commonly occurred when an invited participant was accompanied by a husband, wife, partner or friend who had also taken part in the WTB intervention. This was likely to happen as participants who were 'significant others' were commonly scheduled to undertake their follow-up health assessment back-to-back. A pragmatic decision then had to be made by myself in relation to incorporating the additional accompanying individuals into the data collection process. I felt that the flexibility that I showed in dealing with this was beneficial in that more data could be collected than originally planned.

Case-study participants were recruited opportunistically and again, this process was facilitated by the Physical Activity Team at Sandwell PCT. My role in the selection of participants was limited as it was not possible to undertake purposive sampling. The sample from which case study individuals were selected contained participants who had completed their baseline and three-, or six-month health assessments. Therefore, as previously mentioned the pool of which case study participants could be selected was small relative to the number who participated in the intervention at baseline. Eligible participants were then invited to take part in a 12-month semi-structured interview.

Only four of 30 participants agreed to take part in the follow-up at 12-months. These four individuals had previously undertaken health assessments at baseline, three- and six-months, and had taken part in a semi-structured interview at six-months. When using IPA it is preferable to purposely sample individuals and ideally, it would have been better to select case study participants according to gender, ethnicity and age in addition to baseline health status and stage of change. This would have ensured that insights into the longitudinal impact of the WTB intervention were collected from a range of individuals. It would have also been useful to collect data from individuals who had dropped out of the intervention after their baseline health assessment. However, I am aware that the 'ideal' approach is not always possible to implement when undertaking real-world research and compromise is therefore required.

7.8.3.3 Data Collection

Another advantage of conducting qualitative data collection immediately following the participants health assessment was that the health assessor was able to introduce me to the participant. I was introduced as a research associate from Staffordshire University. I felt that having the health assessor introduce me facilitated the development of rapport between myself and the participant. As I conducted more interviews the more confident I became in my ability to facilitate the interview in a flowing and comprehensive manner. I was able to rely less on the interview schedule to help guide the interview and I also felt that I became more proficient in eliciting fuller responses from participants.

I was integrated into the research process and the accounts provided by participants through semi-structured interviews and focus groups are influenced by the presence of the researcher, the questions I choose to ask and the style in which they are asked. The interview and focus group schedules were developed through a combination of pilot interviews and knowledge of the literature. Although the interview schedule was semi-structured and modified according to participant responses, these questions undoubtedly influenced the direction of the interview.

As mentioned, data collection for the case-study approach mirrored and extended the approach taken during the process evaluation of the WTB intervention presented in Chapter 5. Therefore, at the time of conducting data collection at 12-months I had already completed semi-structured interviews or focus groups with 30 individuals. The procedure for collecting data in the process evaluation was repeated during this case-

study approach. Consequently, I felt more confident collecting data at the 12-month follow-up as a result of my previous experiences and familiarity of the data collection procedure. For example, case-study semi-structured interviews were carried out in the same community locations and followed health assessments conducted by the same health assessors, where possible.

Based on previous experiences of attendance during the process evaluation of the WTB intervention, I was sceptical that participants who had agreed to take part in 12-month interviews would attend. However, this was disproved as all participants did show up for their allocated interview slot. On reflection, this attendance may be a marker of the participant's commitment to and engagement in the project. They were willing to return for another health assessment and take part in an interview. In a way, this made conducting interviews with case-study participants easier as there was an inherent feeling that these individuals wanted to 'be there'.

Participants who agreed to take part in a follow-up at 12-months had previously undertaken a six-month semi-structured interview that I had facilitated. Therefore, I was familiar with each case study participant and they were also familiar with me. This familiarity facilitated the development of rapport at the 12-month interview and provided the foundation for in-depth discussion.

There are other ways in which I could have influenced the participant's perception of me and the way in which we interacted during the interview. For example, my age, gender, ethnicity, social class, job and background could have impacted on participants' opinions. It is, therefore important that they are acknowledged and reflected upon. It is particularly important to reflect on this in relation to the presented case study participants.

In relation to Kate, I felt that I could to relate to her especially as she was a psychologist. My educational background in health psychology and research interests provided a common connection between myself and the participant. Kate was keen to learn about my role in the evaluation of the WTB intervention and also get access to the final report produced for Sandwell PCT. I felt that Kate had a genuine interest in the WTB project which facilitated conversation.

Julia was a very talkative person and therefore it was very easy to converse with her. Although, there was an age difference between myself and Julia, I did not feel that this

influenced the way in which we interacted. It was clear that Julia was very enthusiastic about the WTB intervention and her experiences of it. Julia was also a football fan and supported her local team and this provided a common interest between us. Similarly, Julia was a keen line dancer and in the past I had previously participated in Ballroom and Latin dance classes which provided another common connection.

I felt that I was more comfortable conducting the 12-month semi-structured interviews as I had gathered a large amount of experience through conducting the process evaluation of this project. Comparing the semi-structured interviews at six- and 12-months, provides me with a record of progress and improvements to my ability to conduct a semi-structured interview. This improvement is highlighted through my own perception that I was able to delve deeper in to the participant's experiences at 12-, compared to six-months.

Interviews and focus groups were transcribed as soon as possible after their completion. It was essential that audio data was transcribed verbatim retaining the information in a way that is true to its original nature. As I conducted and transcribed all interview data the process of transcription informed the early stages of data analysis. I felt that this was essential to my understanding of the data.

7.8.3.4 Data Analysis

The analysis of data, using Thematic Analysis (Chapter 5) and IPA (Chapter 6), was the area in which I could potentially exert the greatest personal influence on the findings. My experiences of conducting data collection, knowledge of the literature and my personal views relating to physical activity and its benefits for health will have had an impact on the way in which data was analysed and themes reported in Chapters 5 and 6. I have always been a very active person and I enjoy both recreational physical activity and competitive sport. My positive attitude towards physical activity may have influenced the way in which I interpreted the data and it was therefore essential to be aware of this. As this research was inductive, prior assumptions were avoided where possible. However, in order to justify, design and plan this component of the research, prior knowledge of this topic was unavoidable. It was essential that findings drawn from this research were based on the data presented and that themes developed were representative of the experiences of participants. Previous research was then used to contextualise the findings.

This data were collected through interactive means and as I conducted interviews I became aware of the topics commonly discussed by participants and began to construct a picture of the possible direction of findings. For example, it became evident that overall, participants were positive about their experiences of the WTB intervention and it was clear that there was overlap between individual participants. This means that I came to the analysis with some prior knowledge of the data and potentially some initial analytic thoughts. During coding I began to become aware of the significance of individual themes, this was greatly aided by the use of a table to organise codes and potential themes (Thematic Analysis, Chapter 5). This method allowed me to identify frequently occurring themes across the entire data set. Data analysis was a developmental process, with the initial stages of analysis focusing on describing participant opinion. As the analysis process progressed, I was encouraged by my supervisors to think beyond initial descriptions and to justify and explain patterns of meaning within the data. Reflecting on previous versions of this analysis, I am able to see my interpretation skills develop and subsequently how this development has enhanced the findings of this study.

7.8.3.5 Write-up of Results

The write-up of qualitative analysis is important as it should provide a concise, coherent, logical, non-repetitive and interesting account of the data (Braun & Clarke, 2006). It is essential as it is important for conveying the merit and validity of the research. Therefore, a number of decisions were required in order to plan the content of each chapter and how the results should be presented. For example, in Chapter 6, it was important to communicate sufficient depth and detail of each case-study participant and their experiences of the WTB intervention.

The write-up provided the final opportunity for analysis. At this stage I felt a responsibility to ensure that I conveyed the story articulated by the participants well. In order to do this it was important to select vivid and compelling extract examples to support and illustrate the participants' experiences, meanings and perceptions. As this research was inductive it was essential that findings drawn from this research were based on the data presented and themes developed were representative of the experiences of participants. The write-up also provided the opportunity to conduct a final analysis of selected extracts, to relate the analysis back to the research question, and to use relevant literature to contextualise the findings. I felt that, after many

revisions of Chapters 5 and 6 I was able to produce an accurate and representative account of participants' experiences of the WTB intervention. I felt that this was achieved and this view was supported through supervisor appraisals of the data analysis and results write-up

7.8.4 Real-world Research and the PhD Journey

I have found the PhD journey rewarding, challenging, enlightening and frustrating at times. I took on this PhD role immediately after completing an MSc in Health Psychology, and therefore being relatively inexperienced at working in a 'real-world' setting. This PhD has demonstrated the challenges of real-world research and has highlighted the importance of skills such as flexibility, the ability to compromise, whilst striving to maintain rigour, and working with a range of practitioners to a common end. This PhD has definitely been a journey and there is a marked difference in my levels of confidence and belief in my capability as a researcher from the start of this PhD to now. The mixed methods nature of this research enabled me to develop my skills in both quantitative and qualitative data collection and analysis techniques. This PhD has provided me with the opportunity to broaden my knowledge, skills and experience, for which I am grateful.

7.9 General Conclusions

This research demonstrated that participation in an intervention comprising a health assessment, pedometer, brief health advice and a financial incentive delivered in a community setting can change behaviour and health status at six-month follow-up. The aim of the programme was to encourage participation in lifestyle physical activity, specifically, walking. All participants received either the gold or silver award and on average, were walking between 5,240 steps (approximately 2.1 to 2.6 miles) per day over the intervention period. For some individuals, financial incentives may promote participation in lifestyle physical activity, through aiding uptake and sustaining engagement. Qualitative results suggest that the presence of a financial incentive was the primary motivator for a number of, but not all, individuals engaging in the WTB intervention. Others, however, were likely to be motivated by other intervention

components. The relative contribution of the financial incentive, compared to other intervention components is therefore not known and other components are likely to be important for the overall effects observed. However, qualitative findings suggested that providing a financial incentive within the behaviour change programme aided uptake. Participants who attached a low value on the impact of the incentive reported that they would have participated regardless of the incentive. Alternatively, those who placed a high value on the incentive suggested that it was essential to their participation.

The novel combination of quantitative, qualitative and longitudinal case study methods provided a unique and comprehensive account of this type of financial incentive scheme to promote physical activity. This is the first time this evaluative approach has been applied to this type of intervention and makes an important contribution to the area, identifying some important next steps for research, aside from the changes to practice that resulted from this work.

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Appendices

Appendix 1a: Systematic Review: Article Retrieval Process

Research Question

Are economic incentives targeted at motivating individuals to adopt and / or maintain a physically active lifestyle for health improvement effective? An examination of evidence from published research.

Inclusion Criteria

For inclusion, studies were required to meet the follow four criteria:

1. Published in an English language, peer-reviewed journal. This ensured that a degree of quality assurance was imposed as a result of the reviewing process.

2. Use of an economic incentive in health promotion. All interventions that used incentives which address health promotion activities aimed at increasing levels of physical activity or exercise in its selected population were included, for example, through encouraging adoption, adherence and maintenance. Studies were excluded if physical activity or exercise and the use of incentives were not a main component of the study,

3. Adult participants aged 16 years and above,

4. Contain at least one physical activity or exercise related outcome measure.

Search Strategy

In order to search a broad range of areas, including sport, exercise, psychology and health literature, it was essential that the databases chosen incorporated these fields. As a result the following databases were searched; PubMed (1966 to date), CINAHL (1982 to date), PsychInfo (1887 to date), EMBASE (1974 to date), SPORTDiscus (1800 to date), Web of Knowledge (1970 to date) and Cochrane Library (1800 to date).

Summary of Search Terms

The following search terms were identified and included in each of the database searches:

Incentive or Lottery or Prize or Reward or Token Economy

AND

Physical Activity or Physical Fitness or Exercise or Sports or Motor Activity

Databases Search Procedure

Table A1 shows the procedure for the input of search terms and the number of articles retrieved for each of the databases searched

Table A1. *Database search procedure*

Database	**Search Terms**	**Number of Articles**
PubMed	Detailed:	
#1	Incent*	12584
#2	Lotter*	943
#3	Prize*	12895
#4	Reward*	19329
#5	Token Economy	759
(#1 or #2 or #3 or #4 or #5)	(Incent*or Lotter* or Prize* or Reward* or Token Economy)	44984
#6	Physical Activit*	25656
#7	Physical Fitness	15693
#8	Exercis*	170053
#9	Sport*	53107
#10	Motor Activity [MeSH]	69613
(#6 or #7 or #8 or #9 or #10)	(Physical Activit* or Physical Fitness or Exercis* or Sport* or Motor Activity [MeSH])	282388
(#1 or #2 or #3 or #4 or #5) AND (#6 or #7 or #8 or #9 or #10)	(Incent*or Lotter* or Prize* or Reward* or Token Economy) AND (Physical Activit* or Physical Fitness or Exercis* or Sport* or Motor Activity [MeSH]) (Limits: Humans, English, Adults)	329
Total	***Articles Identified***	***46***
CINAHL	Detailed: incent$ or lotter$ or prize$ or reward$ or token economy AND	159

	physical activit$ or physical fitness or exercis$ or sport$ or motor activit$ (Limits: Humans, English, Adults)	
Total	***Articles Identified***	***13***
PsychInfo	Detailed: incent$ or lotter$ or prize$ or reward$ or token economy AND physical activit$ or physical fitness or exercis$ or sport$ or motor activit$ (Limits: Humans, English, Adults)	240
Total	***Articles Identified***	***19***
EMBASE	Detailed: incent$ or lotter$ or prize$ or reward$ or token economy AND physical activit$ or physical fitness or exercis$ or sport$ or motor activit$ (Limits: Humans, English, Adults)	117
Total	***Articles Identified***	***11***
SPORTDiscus	Detailed: incent$ or lotter$ or prize$ or reward$ or token economy AND physical activit$ or physical fitness or exercis$ or sport$ or motor activit$ (Limits: English, Peer Reviewed Articles)	96
Total	***Articles Identified***	***1***
Web of Knowledge	Detailed: TS=(Incent*or Lotter* or Prize* or Reward* or Token Economy) AND TS=(Physical Activit* or Physical Fitness or Exercis* or Sport* or Motor Activit*) (Limits: English)	921
Total	***Articles Identified***	***8***
Cochrane Library	Detailed: (Incent*or Lotter* or Prize* or Reward* or Token Economy) AND (Physical Activit* or Physical Fitness or Exercis* or Sport* or Motor Activit*) (Limits: English)	71
Total	***Articles Identified***	***15***

* / $ = truncation characters

Results: Summary of Identified Articles

A summary table of the number of articles retrieved from each of the databases searched.

Table A2. *Summary of articles identified*

Database	**Total Number of Articles**	**Articles Identified**
PubMed	330	47
CINAHL	159	13
PsychInfo	240	19
EMBASE	117	11
SPORTDiscus	96	1
Web of Knowledge	920	8
Cochrane Library	71	15
Total	**1934**	**114***

(* includes n=46 duplicate articles)

Retrieval Process Procedure

A flow diagram of the article retrieval process.

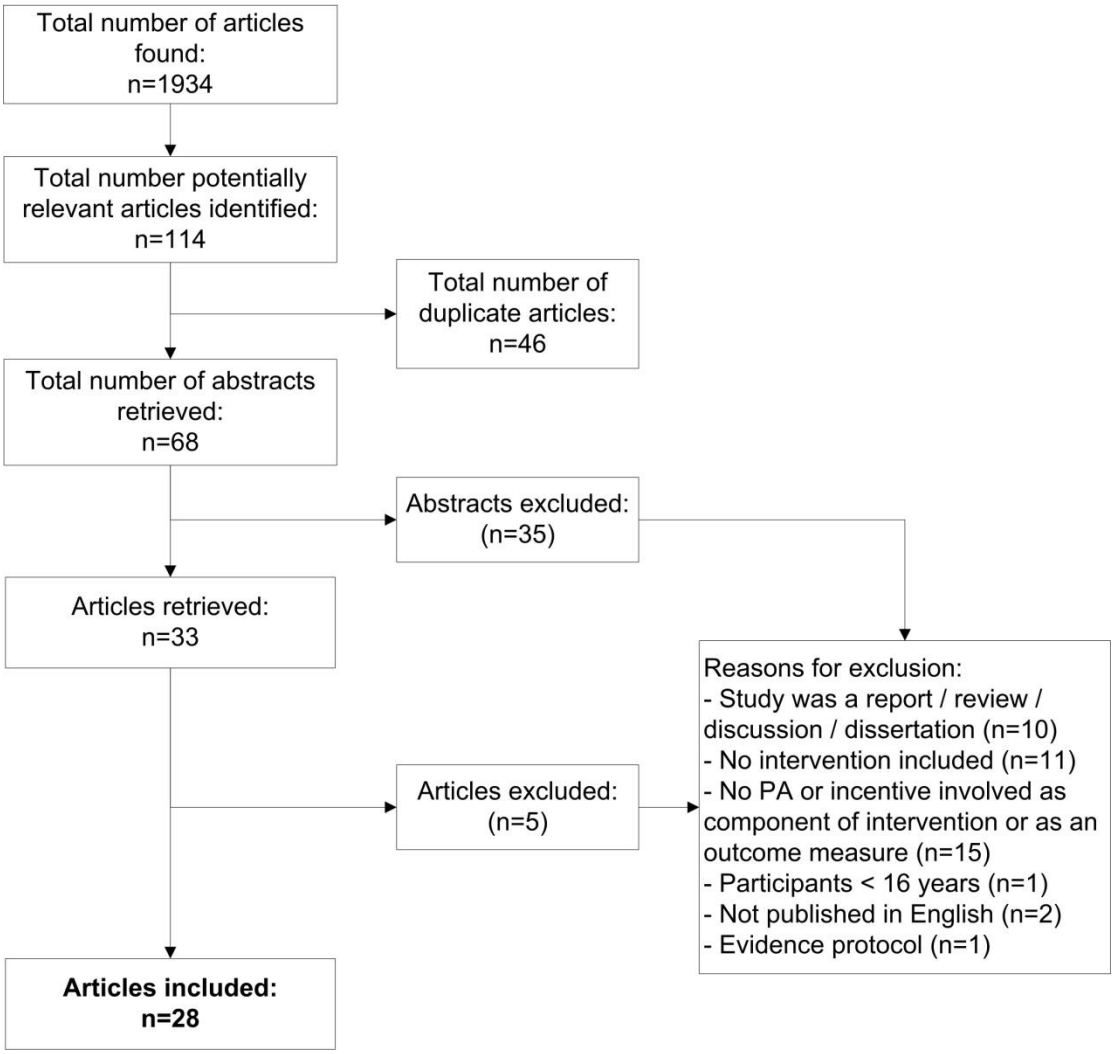

Figure A1. *Article retrieval process*

List of Included Studies (n = 28)

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French, S. A., Jeffery, R. W., & Oliphant, J. A. (1994). Facility access and self-reward as methods to promote physical activity among healthy sedentary adults. *American Journal of Health Promotion, 8*(4), 257-259.

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Green, B. B., Cheadle, A., Pellegrini, A. S., & Harris, J. R. (2007). Active for life: a work-based physical activity program. *Preventing Chronic Disease, 4*(3), A63.

Hammond, S. L., Leonard, B., & Fridinger, F. (2000). The Centers for Disease Control and Prevention Director's Physical Activity Challenge: An Evaluation of a Worksite Health Promotion Intervention. *American Journal of Health Promotion, 15*(1), 17-20.

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Poole, K., Kumpfer, K., & Pett, M. (2001). The impact of an incentive-based worksite health promotion program on modifiable health risk factors. *American Journal of Health Promotion, 16*(1), 21-26.

Pope, L., & Harvey-Berino, J. (2013). Burn and Earn: A Randomized Controlled Trial Incentivizing Exercise During Fall Semester For College First-Year Students. *Preventive Medicine, 56*(3-4), 197–201.

Robison, J. I., Rogers, M. A., Carlson, J. J., Mavis, B. E., Stachnik, T., Stoffelmayr, B., et al. (1992). Effects of a 6-month incentive-based exercise program on adherence and work capacity. *Medicine and Science in Sports and Exercise, 24*(1), 85-93.

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Stein, A. D., Shakour, S. K., & Zuidema, R. A. (2000). Financial incentives, participation in employer-sponsored health promotion, and changes in employee health and productivity: HealthPlus Health Quotient Program. *Journal of Occupational and Environmental Medicine, 42*(12), 1148-1155.

Tucker, R. M., May, C., Bennett, R., Hymer, J., & McHaney, B. (2004). A gym-based wellness challenge for people with type 2 diabetes: effect on weight loss, body composition, and glycemic control. *Diabetes Spectrum, 17(3) , p. 176, 177-80*(Journal Article).

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Yancey, A. K., McCarthy, W. J., Harrison, G. G., Wong, W. K., Siegel, J. M., & Leslie, J. (2006). Challenges in improving fitness: Results of a community-based, randomized, controlled lifestyle change intervention. *Journal of Women's Health, 15*(4), 412-429.

Data Abstraction

Data were abstracted using the following data extraction form.

Table A3. *Data abstraction form*

Study Information	
Study Ref No.	
Author (Year)	
Country	
Aim	
Theoretical Basis	
Study Type	
Design	
Setting	
Length of Intervention (inc. follow-up)	
Sample Information	
Sample Size	
Target Population	
Setting	
Inclusion Criteria	
Exclusion Criteria	
Intervention Information	
Target behaviour(s)	
Intervention description	
Intervention group	

Control group	
Outcome measures	
Validity of measures	
Baseline Characteristics	
Gender	
Age	
Additional Information	
Results	
Statistical Techniques	
Outcome(s); Summary Statistics, Inferential Statistics	
Implementation measures (uptake, completion rate, attrition rate etc)	
Additional Comments	

Appendix 1b: Effective Public Health Practice Project Quality Assessment Tool

McMaster University
School of Nursing

EFFECTIVE PUBLIC HEALTH PRACTICE PROJECT (EPHPP)

Ref ID: _____
Author: _____
Year: _____
Reviewer: _____

QUALITY ASSESSMENT TOOL FOR QUANTITATIVE STUDIES

COMPONENT RATINGS

A) SELECTION BIAS

(Q1) Are the individuals selected to participate in the study likely to be representative of the target population?

1 Very likely
2 Somewhat likely
3 Not likely
4 Can't tell

(Q2) What percentage of selected individuals agreed to participate?

1 80 - 100% agreement
2 60 – 79% agreement
3 less than 60% agreement
4 Not applicable
5 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

B) STUDY DESIGN

Indicate the study design

1 Randomized controlled trial
2 Controlled clinical trial
3 Cohort analytic (two group pre + post)
4 Case-control
5 Cohort (one group pre + post (before and after))
6 Interrupted time series
7 Other specify _____
8 Can't tell

Was the study described as randomized? If NO, go to Component C.

No Yes

If Yes, was the method of randomization described? (See dictionary)

No Yes

If Yes, was the method appropriate? (See dictionary)

No Yes

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

1

C) CONFOUNDERS

(Q1) Were there important differences between groups prior to the intervention?

1 Yes
2 No
3 Can't tell

The following are examples of confounders:

1 Race
2 Sex
3 Marital status/family
4 Age
5 SES (income or class)
6 Education
7 Health status
8 Pre-intervention score on outcome measure

(Q2) If yes, indicate the percentage of relevant confounders that were controlled (either in the design (e.g. stratification, matching) or analysis)?

1 80 – 100%
2 60 – 79%
3 Less than 60%
4 Can't Tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

D) BLINDING

(Q1) Was (were) the outcome assessor(s) aware of the intervention or exposure status of participants?

1 Yes
2 No
3 Can't tell

(Q2) Were the study participants aware of the research question?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

E) DATA COLLECTION METHODS

(Q1) Were data collection tools shown to be valid?

1 Yes
2 No
3 Can't tell

(Q2) Were data collection tools shown to be reliable?

1 Yes
2 No
3 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

F) WITHDRAWALS AND DROP-OUTS

(Q1) Were withdrawals and drop-outs reported in terms of numbers and/or reasons per group?

1 Yes
2 No
3 Can't tell

(Q2) Indicate the percentage of participants completing the study. (If the percentage differs by groups, record the lowest).

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

RATE THIS SECTION	STRONG	MODERATE	WEAK
See dictionary	1	2	3

G) INTERVENTION INTEGRITY

(Q1) What percentage of participants received the allocated intervention or exposure of interest?

1 80 -100%
2 60 - 79%
3 less than 60%
4 Can't tell

(Q2) Was the consistency of the intervention measured?

1 Yes
2 No
3 Can't tell

(Q3) Is it likely that subjects received an unintended intervention (contamination or co-intervention) that may influence the results?

4 Yes
5 No
6 Can't tell

H) ANALYSES

(Q1) Indicate the unit of allocation (circle one)

community organization/institution practice/office individual

(Q2) Indicate the unit of analysis (circle one)

community organization/institution practice/office individual

(Q3) Are the statistical methods appropriate for the study design?

1 Yes
2 No
3 Can't tell

(Q4) Is the analysis performed by intervention allocation status (i.e. intention to treat) rather than the actual intervention received?

1 Yes
2 No
3 Can't tell

GLOBAL RATING

COMPONENT RATINGS

Please transcribe the information from the gray boxes on pages 1-4 onto this page.

A	**SELECTION BIAS**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3
B	**STUDY DESIGN**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3
C	**CONFOUNDERS**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3
D	**BLINDING**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3
E	**DATA COLLECTION METHODS**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3
F	**WITHDRAWALS AND DROPOUTS**	**RATE THIS SECTION** See dictionary	**STRONG** 1	**MODERATE** 2	**WEAK** 3

GLOBAL RATING FOR THIS PAPER (circle one):

1	STRONG	(four STRONG ratings with no WEAK ratings)
2	MODERATE	(less than four STRONG ratings and one WEAK rating)
3	WEAK	(two or more WEAK ratings)

With both reviewers discussing the ratings:

Is there a discrepancy between the two reviewers with respect to the component (A-F) ratings?

No Yes

If yes, indicate the reason for the discrepancy

1 Oversight
2 Differences in interpretation of criteria
3 Differences in interpretation of study

Final decision of both reviewers (circle one):

1 STRONG
2 MODERATE
3 WEAK

4

Appendix 1c: Effective Public Health Practice Project Quality Assessment Tool - Dictionary

EFFECTIVE PUBLIC HEALTH PRACTICE PROJECT (EPHPP)

Quality Assessment Tool for Quantitative Studies Dictionary

The purpose of this dictionary is to describe items in the tool thereby assisting raters to score study quality. Due to under-reporting or lack of clarity in the primary study, raters will need to make judgements about the extent that bias may be present. When making judgements about each component, raters should form their opinion based upon information contained in the study rather than making inferences about what the authors intended.

A) SELECTION BIAS

(Q1) Participants are more likely to be representative of the target population if they are randomly selected from a comprehensive list of individuals in the target population (score very likely). They may not be representative if they are referred from a source (e.g. clinic) in a systematic manner (score somewhat likely) or self-referred (score not likely).

(Q2) Refers to the % of subjects in the control and intervention groups that agreed to participate in the study before they were assigned to intervention or control groups.

B) STUDY DESIGN

In this section, raters assess the likelihood of bias due to the allocation process in an experimental study. For observational studies, raters assess the extent that assessments of exposure and outcome are likely to be independent. Generally, the type of design is a good indicator of the extent of bias. In stronger designs, an equivalent control group is present and the allocation process is such that the investigators are unable to predict the sequence.

Randomized Controlled Trial (RCT)
An experimental design where investigators randomly allocate eligible people to an intervention or control group. A rater should describe a study as an RCT if the randomization sequence allows each study participant to have the same chance of receiving each intervention and the investigators could not predict which intervention was next. If the investigators do not describe the allocation process and only use the words 'random' or 'randomly', the study is described as a controlled clinical trial.

See below for more details.

Was the study described as randomized?

Score YES, if the authors used words such as random allocation, randomly assigned, and random assignment.

Score NO, if no mention of randomization is made.

Was the method of randomization described?

Score YES, if the authors describe any method used to generate a random allocation sequence.

Score NO, if the authors do not describe the allocation method or describe methods of allocation such as alternation, case record numbers, dates of birth, day of the week, and any allocation procedure that is entirely transparent before assignment, such as an open list of random numbers of assignments.
If NO is scored, then the study is a controlled clinical trial.

Was the method appropriate?

Score YES, if the randomization sequence allowed each study participant to have the same chance of receiving each intervention and the investigators could not predict which intervention was next. Examples of appropriate approaches include assignment of subjects by a central office unaware of subject characteristics, or sequentially numbered, sealed, opaque envelopes.

Score NO, if the randomization sequence is open to the individuals responsible for recruiting and allocating participants or providing the intervention, since those individuals can influence the allocation process, either knowingly or unknowingly.

If NO is scored, then the study is a controlled clinical trial.

Controlled Clinical Trial (CCT)
An experimental study design where the method of allocating study subjects to intervention or control groups is open to individuals responsible for recruiting subjects or providing the intervention. The method of allocation is transparent before assignment, e.g. an open list of random numbers or allocation by date of birth, etc.

Cohort analytic (two group pre and post)
An observational study design where groups are assembled according to whether or not exposure to the intervention has occurred. Exposure to the intervention is not under the control of the investigators. Study groups might be non-equivalent or not comparable on some feature that affects outcome.

Case control study
A retrospective study design where the investigators gather 'cases' of people who already have the outcome of interest and 'controls' who do not. Both groups are then questioned or their records examined about whether they received the intervention exposure of interest.

Cohort (one group pre + post (before and after)
The same group is pretested, given an intervention, and tested immediately after the intervention. The intervention group, by means of the pretest, act as their own control group.

Interrupted time series
A time series consists of multiple observations over time. Observations can be on the same units (e.g. individuals over time) or on different but similar units (e.g. student achievement scores for particular grade and school). Interrupted time series analysis requires knowing the specific point in the series when an intervention occurred.

C) CONFOUNDERS

By definition, a confounder is a variable that is associated with the intervention or exposure and causally related to the outcome of interest. Even in a robust study design, groups may not be balanced with respect to important variables prior to the intervention. The authors should indicate if confounders were controlled in the design (by stratification or matching) or in the analysis. If the allocation to intervention and control groups is randomized, the authors must report that the groups were balanced at baseline with respect to confounders (either in the text or a table).

D) BLINDING

(Q1) Assessors should be described as blinded to which participants were in the control and intervention groups. The purpose of blinding the outcome assessors (who might also be the care providers) is to protect against detection bias.

(Q2) Study participants should not be aware of (i.e. blinded to) the research question. The purpose of blinding the participants is to protect against reporting bias.

E) DATA COLLECTION METHODS

Tools for primary outcome measures must be described as reliable and valid. If 'face' validity or 'content' validity has been demonstrated, this is acceptable. Some sources from which data may be collected are described below:

Self reported data includes data that is collected from participants in the study (e.g. completing a questionnaire, survey, answering questions during an interview, etc.).

Assessment/Screening includes objective data that is retrieved by the researchers. (e.g. observations by investigators).

Medical Records/Vital Statistics refers to the types of formal records used for the extraction of the data.

Reliability and validity can be reported in the study or in a separate study. For example, some standard assessment tools have known reliability and validity.

F) WITHDRAWALS AND DROP-OUTS

Score **YES** if the authors describe BOTH the numbers and reasons for withdrawals and drop-outs.

Score **NO** if either the numbers or reasons for withdrawals and drop-outs are not reported.

The percentage of participants completing the study refers to the % of subjects remaining in the study at the final data collection period in all groups (i.e. control and intervention groups).

G) INTERVENTION INTEGRITY

The number of participants receiving the intended intervention should be noted (consider both frequency and intensity). For example, the authors may have reported that at least 80 percent of the participants received the complete intervention. The authors should describe a method of measuring if the intervention was provided to all participants the same way. As well, the authors should indicate if subjects received an unintended intervention that may have influenced the outcomes. For example, co-intervention occurs when the study group receives an additional intervention (other than that intended). In this case, it is possible that the effect of the intervention may be over-estimated. Contamination refers to situations where the control group accidentally receives the study intervention. This could result in an under-estimation of the impact of the intervention.

H) ANALYSIS APPROPRIATE TO QUESTION

Was the quantitative analysis appropriate to the research question being asked?

An intention-to-treat analysis is one in which all the participants in a trial are analyzed according to the intervention to which they were allocated, whether they received it or not. Intention-to-treat analyses are favoured in assessments of effectiveness as they mirror the noncompliance and treatment changes that are likely to occur when the intervention is used in practice, and because of the risk of attrition bias when participants are excluded from the analysis.

Component Ratings of Study:

For each of the six components A – F, use the following descriptions as a roadmap.

A) SELECTION BIAS

Strong: The selected individuals are very likely to be representative of the target population (Q1 is 1) **and** there is greater than 80% participation (Q2 is 1).

Moderate: The selected individuals are at least somewhat likely to be representative of the target population (Q1 is 1 or 2); **and** there is 60 - 79% participation (Q2 is 2). 'Moderate' may also be assigned if Q1 is 1 or 2 and Q2 is 5 (can't tell).

Weak: The selected individuals are not likely to be representative of the target population (Q1 is 3); **or** there is less than 60% participation (Q2 is 3) **or** selection is not described (Q1 is 4); and the level of participation is not described (Q2 is 5).

B) DESIGN

Strong: will be assigned to those articles that described RCTs and CCTs.

Moderate: will be assigned to those that described a cohort analytic study, a case control study, a cohort design, or an interrupted time series.

Weak: will be assigned to those that used any other method or did not state the method used.

C) CONFOUNDERS

Strong: will be assigned to those articles that controlled for at least 80% of relevant confounders (Q1 is 2); **or** (Q2 is 1).

Moderate: will be given to those studies that controlled for 60 – 79% of relevant confounders (Q1 is 1) **and** (Q2 is 2).

Weak: will be assigned when less than 60% of relevant confounders were controlled (Q1 is 1) **and** (Q2 is 3) **or** control of confounders was not described (Q1 is 3) **and** (Q2 is 4).

D) BLINDING

Strong: The outcome assessor is not aware of the intervention status of participants (Q1 is 2); **and t**he study participants are not aware of the research question (Q2 is 2).

Moderate: The outcome assessor is not aware of the intervention status of participants (Q1 is 2); **or** the study participants are not aware of the research question (Q2 is 2); **or b**linding is not described (Q1 is 3 and Q2 is 3).

Weak: The outcome assessor is aware of the intervention status of participants (Q1 is 1); **and** the study participants are aware of the research question (Q2 is 1).

E) DATA COLLECTION METHODS

Strong: The data collection tools have been shown to be valid (Q1 is 1); **and** the data collection tools have been shown to be reliable (Q2 is 1).

Moderate: The data collection tools have been shown to be valid (Q1 is 1); **and** the data collection tools have not been shown to be reliable (Q2 is 2) **or** reliability is not described (Q2 is 3).

Weak: The data collection tools have not been shown to be valid (Q1 is 2) **or** both reliability and validity are not described (Q1 is 3 and Q2 is 3).

F) WITHDRAWALS AND DROP-OUTS - a rating of:

Strong: will be assigned when the follow-up rate is 80% or greater (Q2 is 1).

Moderate: will be assigned when the follow-up rate is 60 – 79% (Q2 is 2) **OR** Q2 is 5 (N/A).

Weak: will be assigned when a follow-up rate is less than 60% (Q2 is 3) or if the withdrawals and drop-outs were not described (Q2 is 4).

April 2008: Z:\Common\Resources\Tools\Validity and Quality Assessment Tools\QADictionary_april2008

Appendix 2: Letter of Ethical Approval

STAFFORDSHIRE UNIVERSITY

Faculty of Health/Faculty of Sciences

ETHICAL APPROVAL FEEDBACK

Student name:	**Gemma Hurst**
Title of Study:	**"Walk to Beijing" – An evaluation of an incentive scheme to promote physical activity and positive health behaviour**
Award Pathway:	**MPhil/PhD**
Status of approval:	**Approved**

Action now needed:

Your project proposal has now been approved by the Faculty's Ethics Panel and you may now commence the implementation phase of your study. You do not need to approach the Local Research Ethics Committee. You should note that any divergence from the approved procedures and research method will invalidate any insurance and liability cover from the University. You should, therefore, notify the Panel of any significant divergence from this approved proposal.

You should arrange to meet with your supervisor for support during the process of completing your study and writing your dissertation.

Comments for your consideration:

Thank you for forwarding the amendments requested by the Panel

Signed: Lou Taylor
Deputy Chair of the Faculty of Health/Faculty of Sciences Ethics Panel

Date: 17th May 2007

Appendix 3: Walk to Beijing Registration Card

Walk to Beijing

is an exciting new project run by
Sandwell Primary Care Trust.

It will start in January 2007 and Finish in March 2008

The aim of the project is to help and encourage people to look after their health by staying active and eating well.

How will it work?

Once you have registered you will agree a start date and undergo a confidential health assessment where the following measurements will be recorded:

- *Blood Pressure*
- *Waist-Hip ratio*
- *Height & Weight to calculate Body Mass Index (BMI)*
- *You will also be asked to complete a general health questionnaire.*

Once you have completed your health assessment you will be issued with a step counter and record sheet together with advice about how you can increase your daily physical activity levels. You will be asked to record your daily steps.

This assessment will then be repeated three months later. If you have achieved an improvement in one of the measurements taken you will qualify for a reward.

Rewards will include gift vouchers for high street shops and supermarkets up to the value of £40.00

The value of your reward will be decided by the level of health improvement you make between your two assessments but you can still qualify for a reward even by just turning up for your two assesments.

At your second assessment you will also be required to hand in your record sheet of how many steps you have taken. We will then be able to report back how far everyone has walked in total and compare this with the distance to Beijing, host city of the 2008 Olympics. We will also be able to compare which of the six towns has walked the furthest!!

Sign Up Here!

If you would like to take part in

Walk to Beijing

please complete your details below:

PLEASE USE BLOCK CAPITALS

NAME .....

.....

ADDRESS .....

.....

.....

.....

PostCode .....

E-MAIL .....

.....

CONTACT NUMBERS:

HOME .....

MOBILE .....

Sandwell Partnership
MAKING CHANGE HAPPEN
Health Partnership

Sandwell NHS
Primary Care Trust

Supported by Sandwell Neighbourhood Renewal Fund

Appendix 4: Health Assessor Guidance Pack

Page 1.

Page 2.

走向北京

WALK TO BEIJING

INTRODUCTION GUIDANCE NOTES

Please use the following text as your introduction;

" Hello ******.
My name is ****** and I'm a qualified health & fitness assessor.
This health assessment is going to take ½ hour. We will complete a physical activity readiness questionnaire, carry out some health and fitness tests, complete a questionnaire and I will then give you information on using your step counter and the plan for the next three months.
After 3 months you will be contacted for your re-assessment where we will carry out the same tests to see if there has been an improvement and allocate you the appropriate reward. I also need to inform you that you have the right to withdraw from the project at anytime."

Page 3.

走向北京

WALK TO BEIJING

Inclusion / Exclusion Criteria

INCLUSION

*People 16+ who would benefit by increasing their physical activity levels
*GP within Sandwell or resident in Sandwell

EXCLUSION

*Symptomatic CHD or assymptomatic post MI who have not undergone coronary rehab programme.
*Uncontrolled hypertension >160/100mmHg
*Unstable diabetics (can't exercise below 5 or above17 mmols/l)
*Uncontrolled or acute heart failure
*Ventricular or aortic aneurysm
*Uncontrolled tachycardia (>100bpm at rest)
*Unstable or recently diagnosed angina (last 3 months)

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走向北京

WALK TO BEIJING

1st HEALTH TESTS GUIDANCE NOTES

Please complete in this order

*PAR-Q
*TESTS
- Blood Pressure
- Height (NO Shoes)
- Weight (NO Shoes)
- Waist
- Hip

Calculate BMI & Waist/Hip Ratio
*Complete Wellbeing questionnaires
(Please see Wellbeing Questionnaire guidance notes)

Page 5.

走向北京

WALK TO BEIJING

2nd HEALTH TESTS GUIDANCE NOTES

Please complete in this order

*TESTS
- Blood Pressure
- Height (NO Shoes)
- Weight (NO Shoes)
- Waist
- Hip

Calculate BMI & Waist/Hip Ratio
*Complete Wellbeing questionnaires
(Please see Wellbeing Questionnaire guidance notes)

Compare differences

Page 6.

走向北京

WALK TO BEIJING

PAR-Q GUIDANCE NOTES

- Carbon Copied pad
- Input ID number on left hand side
- Read out loud to participant and complete on their behalf
- Make sure participant signs and dates the par-q
- Complete the details section for them (BLOCK CAPITALS)
- We must have a POSTCODE
- Ask the questions at the end of the par - q
- White top copy to Lindsay @ Kingston House
- Keep the bottom copy for 2nd assessment in secure place
- After 2nd assessment return yellow copy to Lindsay @ Kingston House

Page 7.

走向北京

WALK TO BEIJING

SPECIFIC HEALTH TEST GUIDANCE NOTES

Guidance for health tests

You will be asked questions about the results of the health tests you do on each client. Due to limited time you will not be able to go into much detail therefore the following is what we recommend you reply with:

BMI – Give the client their BMI value. State that this is a calculation taking into consideration their height and weight and should be between 20 and 25 and physical activity will help reduce / control their BMI.

Waist Hip ratio – This is calculated by dividing waist and hip:
Waist = waist to hip ratio
Hip

The idea of this measurement is to ensure that clients are not carrying to much weight round their waists as this is closer to the heart. Therefore the higher the number the more strain the heart will possibly be under.

Blood Pressure – Give the client their blood pressure value. Explain that this is the pressure exerted on the arteries as the heart contracts and relaxes. The recommended reading is 120/80 and physical activity and healthy living will help reduce this.
*** Note that if the reading is over 160/100 then the client will not be able to take part in the programme till they have this checked out with their GP.

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走向北京

WALK TO BEIJING

WELLBEING QUESTIONNAIRES GUIDANCE NOTES

Complete the questionnaires for participants

Carbon Pad Questionnaire;

- Put ID number on top
- Tick one box for each of the 5 groups

Health Thermometer;
Ask participants to show you on the thermometer how they feel about their health.
0 is worst imaginable health state
100 is best imaginable health state

Photocopied questionnaire;

- Put ID number on top
- Ask questions and circle numbered response

On the reverse
Ask questions and circle numbered response.

Page 9.

走向北京

WALK TO BEIJING

HEALTH RECORD SHEET GUIDANCE NOTES

1st Assessment

- Carbon Copied Pad
- Input name and ID number
- Record measurements
- White copy to Lindsay @ Kingston House
- Keep yellow bottom copy for 2nd assessment in secure place

2nd Assessment

- Record measurements
- Follow criteria for rewards
- Indicate reward achieved and choice of reward
- Get permission for follow up contact from Staffordshire University
- Return yellow copy to Lindsay at Kingston House

Page 10.

走向北京

WALK TO BEIJING

STEP COUNTER GUIDANCE NOTES

- Remove the tag to activate the battery

Tell Participants:

- You will need to wear your step counter all day from when you get up in the morning until you go to bed at night.
- Inside the step counter is a built in pendulum which registers each step you take.
- When the pendulum moves it will make a clicking sound – this is completely normal.
- The best place for the step counter is close to your hip on a belt or at the top of your waist band.
- To record accurately it must be horizontal so not tilting.
- To reset your step counter at the end of the day just press the reset buttons [show the participant where this is).

Please tell participants:

" The steps you do will be added together to get your total distance. This will then be added to the overall distance for your town"

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WALK TO BEIJING

LOG BOOK GUIDANCE NOTES

- Complete participants name put their ID number next to their name on the front of the log book.
- Ask participants to complete the number of steps they do every day over the next three months.
- Tell participants that they MUST return their log book at their 2nd assessment to qualify for a reward.
- Refer to the back page and advise participants that there are helpful hints on how to increase their daily activity levels.

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WALK TO BEIJING

REWARD GUIDANCE NOTES

"Rewards will be allocated in relation to the level of health improvement you make over the next 3 months. The difference will be taken from the measurements today compared with the measurements we take in 3 months. Even if you haven't made an improvement you will still be rewarded for attending your second assessment.
Your reward will be £10, £20 or £40's worth of vouchers dependant on the level of improvement you make"

Note;
Do not disclose the criteria for rewards.

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走向北京

WALK TO BEIJING

REWARDS

*ASDA

*SAINSBURYS

*LOVE2SHOP

A1 Motor Stores	H. Samuel	£-stretcher
Adams Kids	Halfords	Peter Briggs
American Golf	Happit	Ponden Mill
Brantano	HMV	River Island
Bensonshoe	T J Hughes	Robbs
Bhs	Homebase	Rosebys
Bonmarche	Instore	Shoefayre
Boots	Iceland	Semi-Chem
Bargain Crazy	Joplings	Shoe Express
Carphone Warehouse	MK One	Shoe Zone
Comet	Lewis's	Robert Dyas
Contessa	La Senza	Streetwise Sports
d2 men & women	Mothercare	Stead & Simpson
Fads	JJB Sports	W H Smith
Ethel Austin	Optical Express	Woolworths
Ernest Jones	New Look	Threshers
Fawcetts	Qube	The Local
Focus DIY	Peacocks	Virgin Megastores

*LOVE2PLAY

Alton Towers	Chessington World of Adventure	Planet Hollywood
American Golf	Hard Rock Cafe	The Local
Buyagift	Café Rouge	The London Pass
Blackpool Pleasure Beach	Lightwater Valley	Thorpe Park
Bella Italia	Legoland	Threshers
Hastings Hotels	Madame Tussauds	Wine Rack
	Marriott Hotels	Warehouse Wines
		Warwick Castle
		Virgin Experiences

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走向北京

WALK TO BEIJING

CRITERIA FOR REWARDS

BRONZE	SILVER	GOLD
£10.00	£20.00	£40.00
Attend both assessments	Attend both assessments	Attend both assessments
Hand in a completed step log book	Hand in a completed step log book	Hand in a completed step log book
No improvement in any of the health checks	An improvement in 1-2 of the health checks	An improvement in 3-4 of the health checks

Appendix 5: Health Record Sheet

SANDWELL PRIMARY CARE TRUST
Kingston House
438, High Street,
West Bromwich,
B70 9LD
Telephone 08451 550500
Facsimile 0121 6121410

WALK TO BEIJING
Health Record Sheet

NAME: _____

ID Number: _____

Test	Initial Assessment	3 Month Assessment
Well Being		
Blood Pressure (mmol)		
Height (m)		
Weight (kg)		
BMI		
Waist (cm)		
Hip (cm)		
Waist to Hip ratio		

Reward Achieved BRONZE SILVER GOLD

Choice of Reward _____

Follow up contact from Staffordshire University ok? Yes/No

Appendix 6: Physical Activity Readiness Questionnaire (PAR-Q)

SANDWELL PRIMARY CARE TRUST
Kingston House
438, High Street,
West Bromwich,
B70 9LD
Telephone 08451 550500
Facsimile 0121 6121410

PARTICIPANT ID NUMBER:

WALK TO BEIJING

Physical Activity Readiness Questionnaire

If you have decided to increase the amount of physical activity in your life, completing this questionnaire is a worthwhile first step. For most people, physical activity should not pose a problem or hazard, but the PAR-Q will identify the small number of people who would be wise to receive medical advice before starting.

- Has your doctor ever said that you have a heart condition and recommended only medically approved physical activity?	Yes/No
- Do you feel pain in your chest when you do physical activity?	Yes/No
- In the past month, have you had chest pain when you were not doing physical activity?	Yes/No
- As a result of dizziness, do you lose consciousness or balance?	Yes/No
- Do you have a bone or joint problem that may be aggravated by physical activity?	Yes/No
- Do you have diabetes?	Yes/No
- Do you have asthma or epilepsy?	Yes/No
- Do you consider yourself to have a disability?	Yes/No
- Are you pregnant, or have you been pregnant within the past three months?	Yes/No
- Do you know of any reason, either through your own experience or medical advice, why you should not exercise without medical approval?	Yes/No
- Do you have any other conditions that the health assessor may need to know about?	Yes/No
- Do you smoke ?	Yes/No

If you have answered YES to any of the questions above, then further medical advice will need to be sort if not already done.

Acknowledgment:
I acknowledge that there are risks and dangers inherent in physical activity and declare that all questions are answered fully and I know of no reason why I should not exercise. I also agree to follow instructions given by the instructor and the activity plan advised to me. If I wish to alter the programme in any way I shall seek advice first. I shall inform the programme of any medical changes. I consent to having my data recorded and stored in a manor that conforms to the data protection act.

Signed: Date:

The following information will be treated in confidence and for your records only.

Name MR/MRS/MISS:
Address:

Town: Postcode:
Telephone HOME: WORK:
Date of Birth: (DD/MM/YYYY)
Ethnic Origin:
Occupation:
Emergency Tel Number:
How did you hear about WALK TO BEIJING?

Did any of the following areas influence your decision to take part?

The Vouchers	A LOT	A LITTLE	NOT AT ALL
The Step Counter	A LOT	A LITTLE	NOT AT ALL
Support to Improve your Health	A LOT	A LITTLE	NOT AT ALL
Town Competition	A LOT	A LITTLE	NOT AT ALL
The Link to the Beijing Olympics	A LOT	A LITTLE	NOT AT ALL

Which voucher is most appealing to you?

Appendix 7: EQ-5D Questionnaire

Participant ID - _____

GENERAL HEALTH (EuroQol)

By placing a tick in one box in each group below, please indicate which statement best describes your own **health state today.**

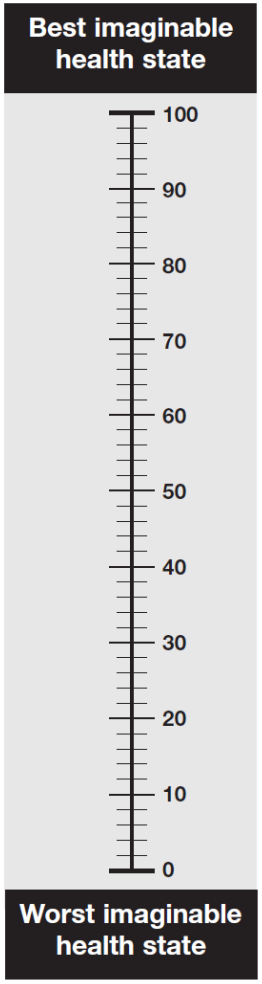
Do not tick more than one box in each group.

1. Mobility	
I have no problems walking about	
I have some problems in walking about	
I am confined to bed	
2. Self-care	
I have no problems with self-care	
I have some problems washing or dressing myself	
I am unable to wash or dress myself	
3. Usual activities (e.g. work, study, housework, family or leisure activities)	
I have no problems with performing my usual activities	
I have some problems with performing my usual activities	
I am unable to perform my usual activities	
4. Pain/Discomfort	
I have no pain or discomfort	
I have moderate pain or discomfort	
I have extreme pain or discomfort	
5. Anxiety/Depression	
I am not anxious or depressed	
I am moderately anxious or depressed	
I am extremely anxious or depressed	

To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked by 0.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is.

Your own health state today



Appendix 8: TTM and TPB Questionnaire

TTM

A. Do you participate in <u>regular</u> moderate physical activity (e.g., brisk walking and cycling) five times a week for at least 30 min each time?"

Please tick one box:

1	No, and I do not intend to in the next 6 months	
2	No, but I intend to in the next 6 months	
3	No, but I intend to in the next 30 days	
4	Yes, I have been, but for less than 6 months	
5	Yes, I have been for more than 6 months	

B. All of the questions in this section are concerned with whether or not, during the next 6 months, you intend to participate in <u>regular</u> moderate physical activity (e.g. brisk walking and cycling), five times a week for at least 30 min each time.
This will be referred to simply as, '*moderate physical activity in the future*'.

1.	I intend to participate in moderate physical activity in the future.								
	Definitely do not	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Definitely do*

2.	I believe I have the ability to participate in moderate physical activity in the future.							
	Definitely do not	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Definitely do*

	Overall, my attitude towards participating in moderate physical activity in the future is …… (please circle one number <u>on each line</u>)								
3.	*Negative*	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Positive*
4.	*Anti*	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Pro*
5.	*Bad*	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Good*

6.	People close to me think I should participate in moderate physical activity.							
	Disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Agree*

7.	I *want* to participate in moderate physical activity in the future.							
	Definitely do not	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Definitely do*

8.	To what extent do you see yourself as being capable of participating in moderate physical activity in the future?							
	Very incapable of participating..	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Very capable of participating…*

9.	How likely is it that you will participate in moderate physical activity in the future?							
	Very unlikely	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Very likely*

10.	People who are important to me would:							
	Disapprove of my participating in moderate physical activity in the future	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Approve of my participating* in moderate physical activity in the future

11.	People who are important to me want me to participate in moderate physical activity in the future.							
	Disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Agree*

12.	How confident are you that you will be able to participate in moderate physical activity in the future?							
	Not very confident	**1**	**2**	**3**	**4**	**5**	**6**	**7**	*Very confident*

Appendix 9: SF12v2 Questionnaire

SF-12 **Participant ID**_____

For each of the following questions, please circle the option that best describes your answer.

1	In general, would you say your health is:				
	Excellent	**Very good**	**Good**	**Fair**	**Poor**
	1	2	3	4	5

2	The following questions are about activities you might do during a typical day. Does **your health now limit** you in these activities? If so, how much?			
		Yes, limited a lot	**Yes, limited a little**	**No, not limited at all**
	a. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf	1	2	3
	b. Climbing several flights of stairs	1	2	3

3	During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of your **physical health**?					
		All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
	a. Accomplished less than you would like	1	2	3	4	5
	b. Were limited in the kind of work or other activities	1	2	3	4	5

4	During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any **emotional problems** (such as feeling depressed or anxious)?					
		All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
	a. Accomplished less than you would like	1	2	3	4	5
	b. Did work or activities less carefully than usual	1	2	3	4	5

5	During the past 4 weeks, how much did **pain** interfere with your normal work (including both work outside the home and housework)?				
	Not at all	**A little bit**	**Moderately**	**Quite a bit**	**Extremely**
	1	2	3	4	5

6	These questions are about **how you feel** and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks...					
		All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
	a. Have you felt calm and peaceful?	1	2	3	4	5
	b. Did you have a lot of energy?	1	2	3	4	5
	c. Have you felt downhearted and depressed?	1	2	3	4	5

7	During the past 4 weeks, how much of the time has your **physical health or emotional problems** interfered with your social activities (like visiting friends, relatives, etc.)?				
	All of the time	**Most of the time**	**Some of the time**	**A little of the time**	**None of the time**
	1	2	3	4	5

Appendix 10: Data Screening and Assumption Testing

Prior to conducting inferential statistics, underlying assumption testing for parametric tests was carried out. Data was firstly screened for accuracy using descriptive statistics. Normality was assessed, where appropriate, for each dependent variable (and each level of the independent variable) using histograms and boxplots. Visual inspection of histograms and boxplots demonstrated the presence of potential outliers which may have contributed to a number of variables being moderately skewed.

Baseline

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BMI	1675	16.38	46.29	28.6881	5.34069
Systolic BP	1673	81	195	134.08	18.630
Diastolic BP	1672	44	117	79.81	11.411
SF12 - PCS - Baseline	1537	19.37	70.89	48.8513	8.95564
SF12 - MCS - Baseline	1537	17.34	74.36	49.4851	9.76642
Health State (Thermometer)	1668	10	100	69.54	18.190
Valid N (listwise)	1532				

Descriptive Statistics

	Variance
BMI	28.523
Systolic BP	347.089
Diastolic BP	130.218
SF12 - PCS - Baseline	80.203
SF12 - MCS - Baseline	95.383
Health State (Thermometer)	330.884
Valid N (listwise)	

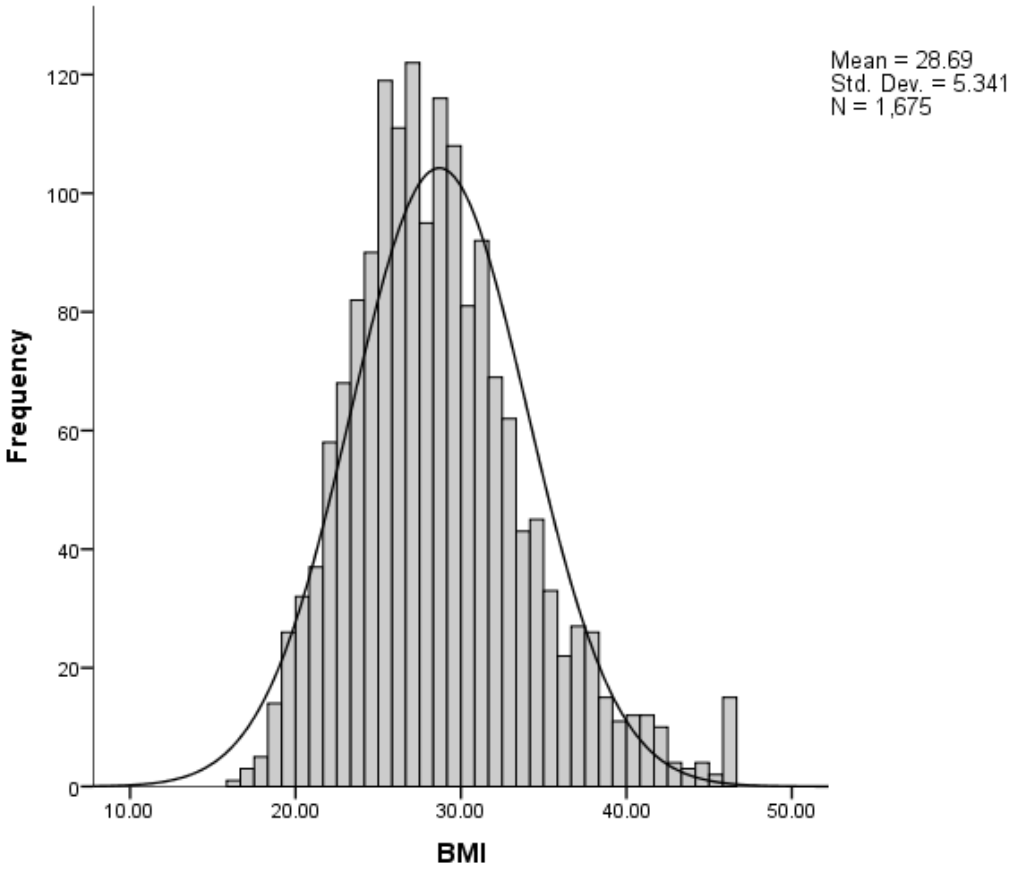
Descriptive Statistics

Gender		N	Minimum	Maximum	Mean
Male	WHR	428	.72	1.20	.9441
	Waist Circumference - Baseline	433	63.00	141.55	98.7842
	Valid N (listwise)	428			
Female	WHR	1205	.62	1.12	.8612
	Waist Circumference - Baseline	1230	45.88	141.02	93.4471
	Valid N (listwise)	1205			

Descriptive Statistics

Gender		Std. Deviation
Male	WHR	.08174
	Waist Circumference - Baseline	12.99375
	Valid N (listwise)	
Female	WHR	.08456
	Waist Circumference - Baseline	14.45778
	Valid N (listwise)	

BMI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20.00
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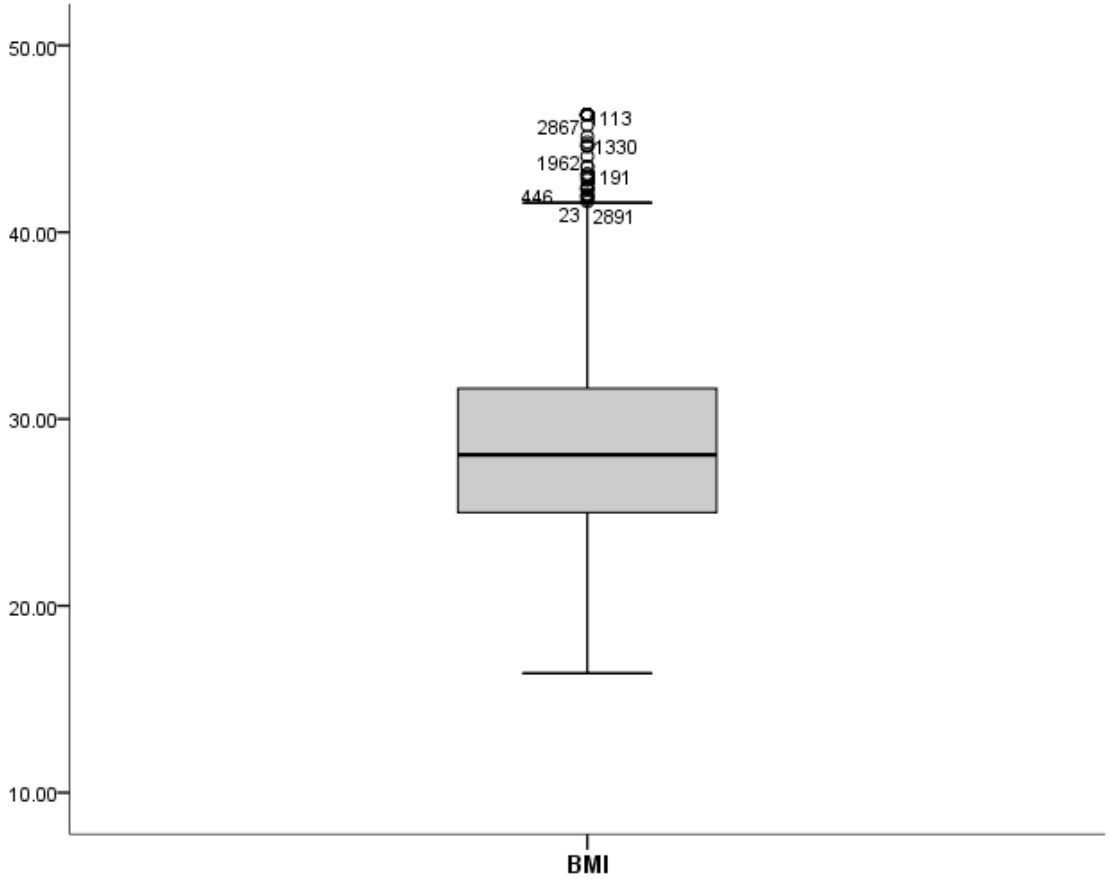
40.00
50.00
BMI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20.00
10.00
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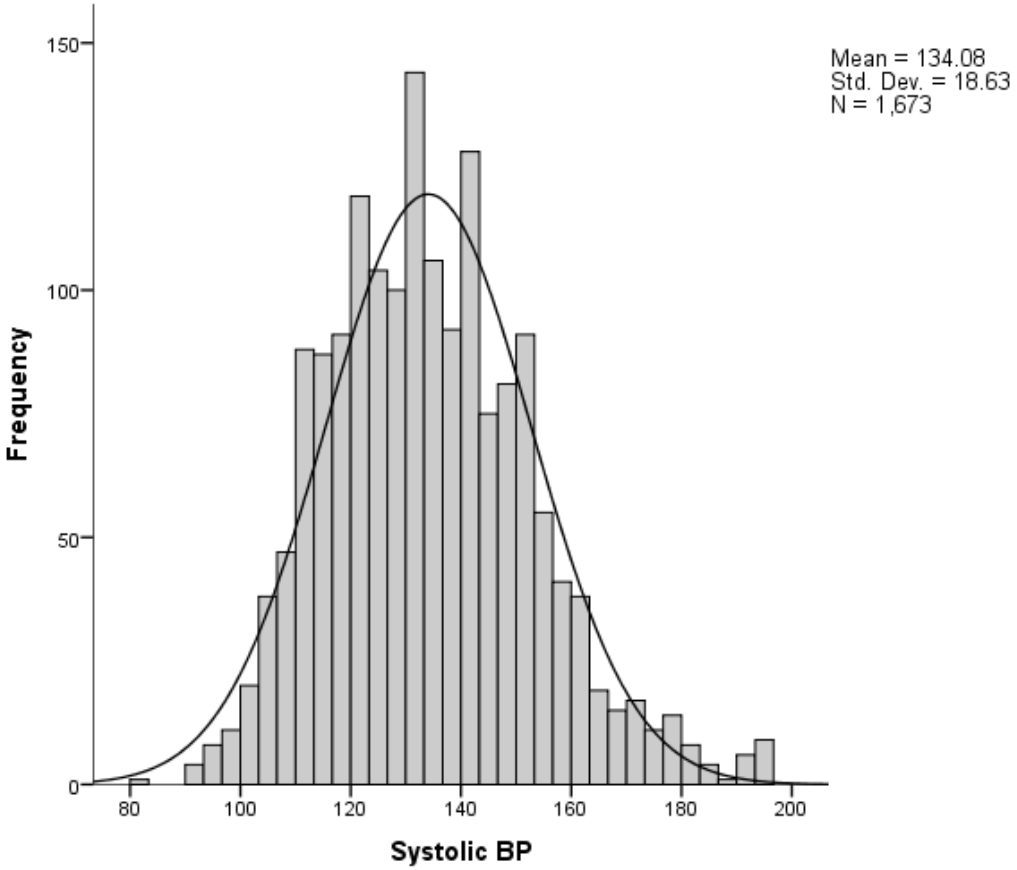
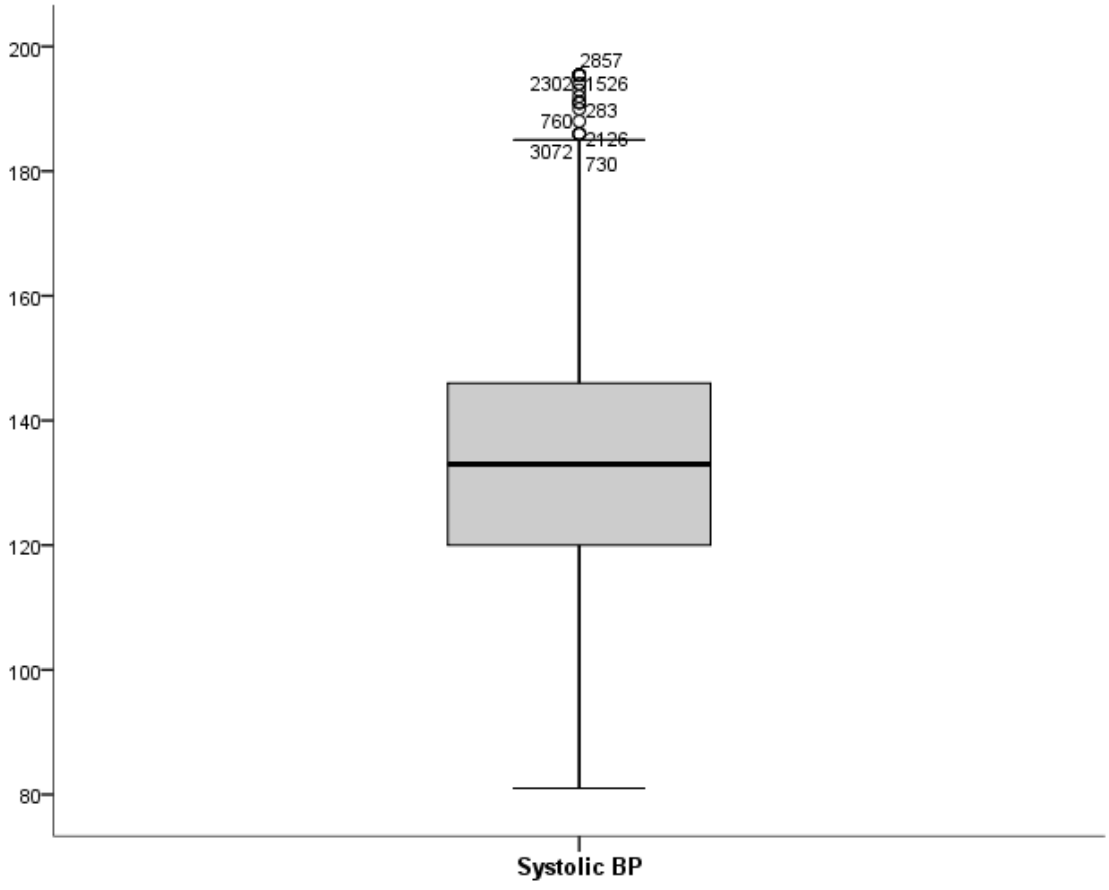
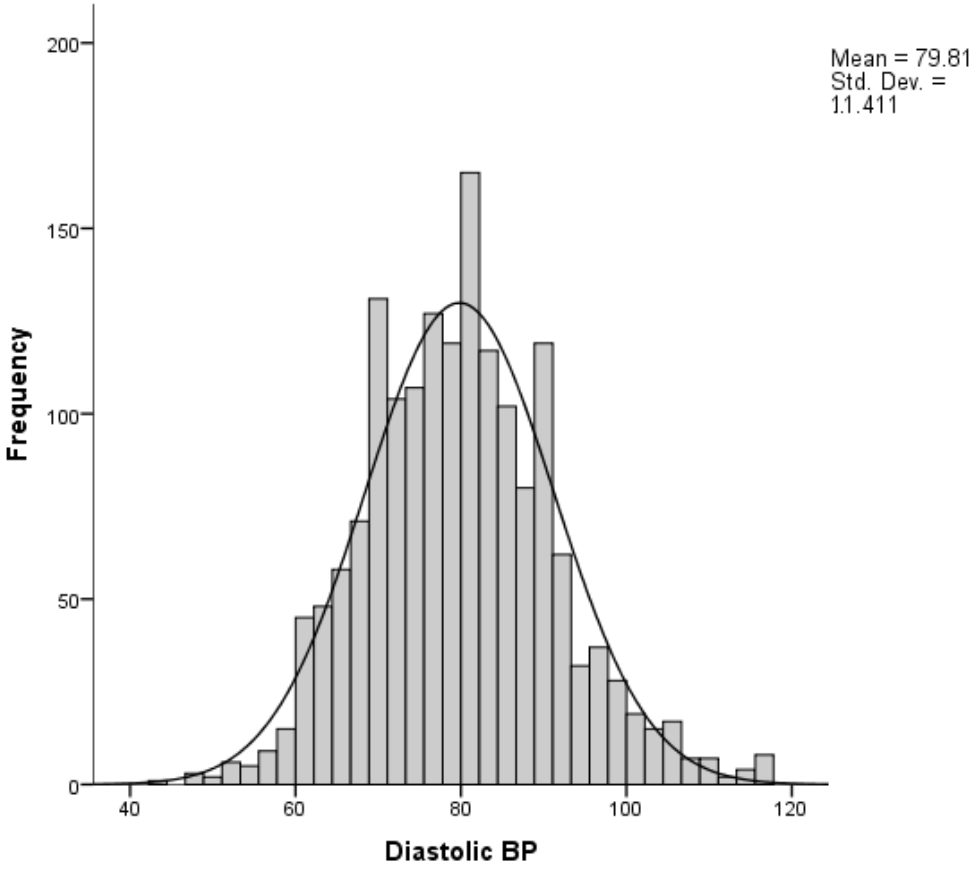
446
23
2891
BMI

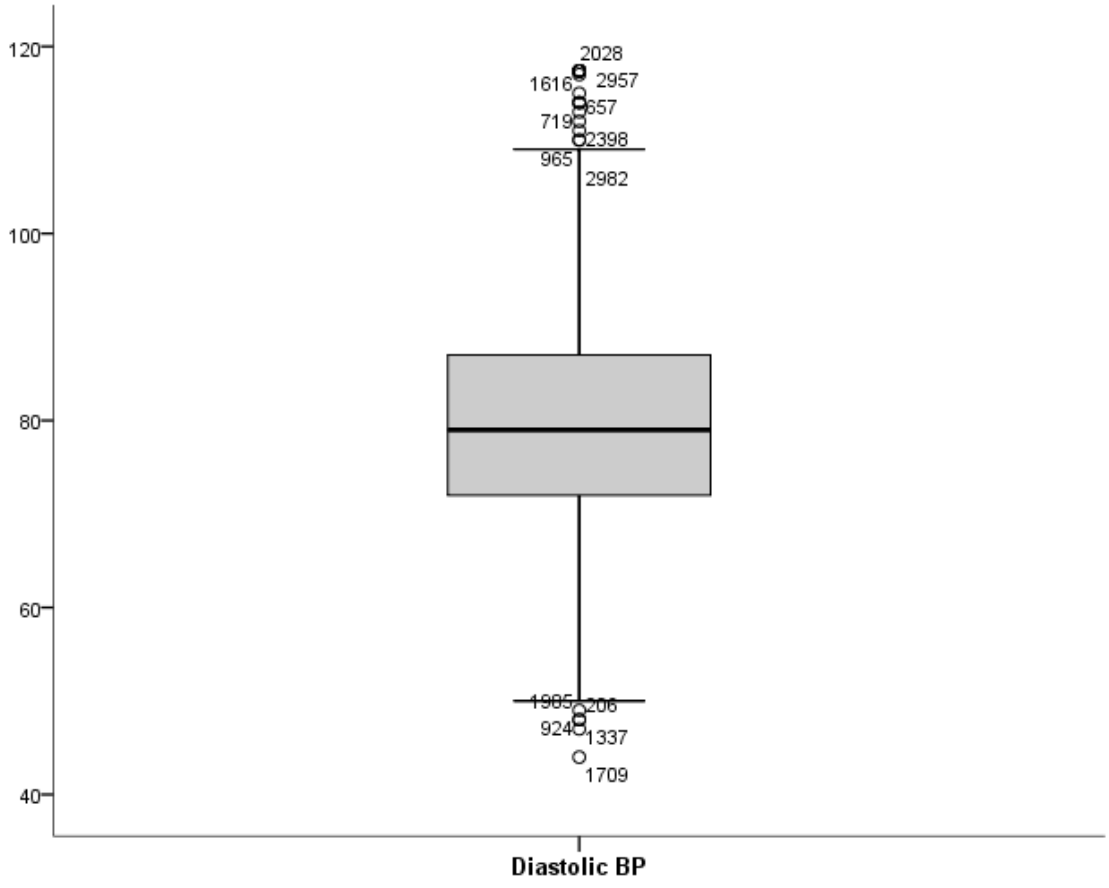
Systolic Blood Pressure



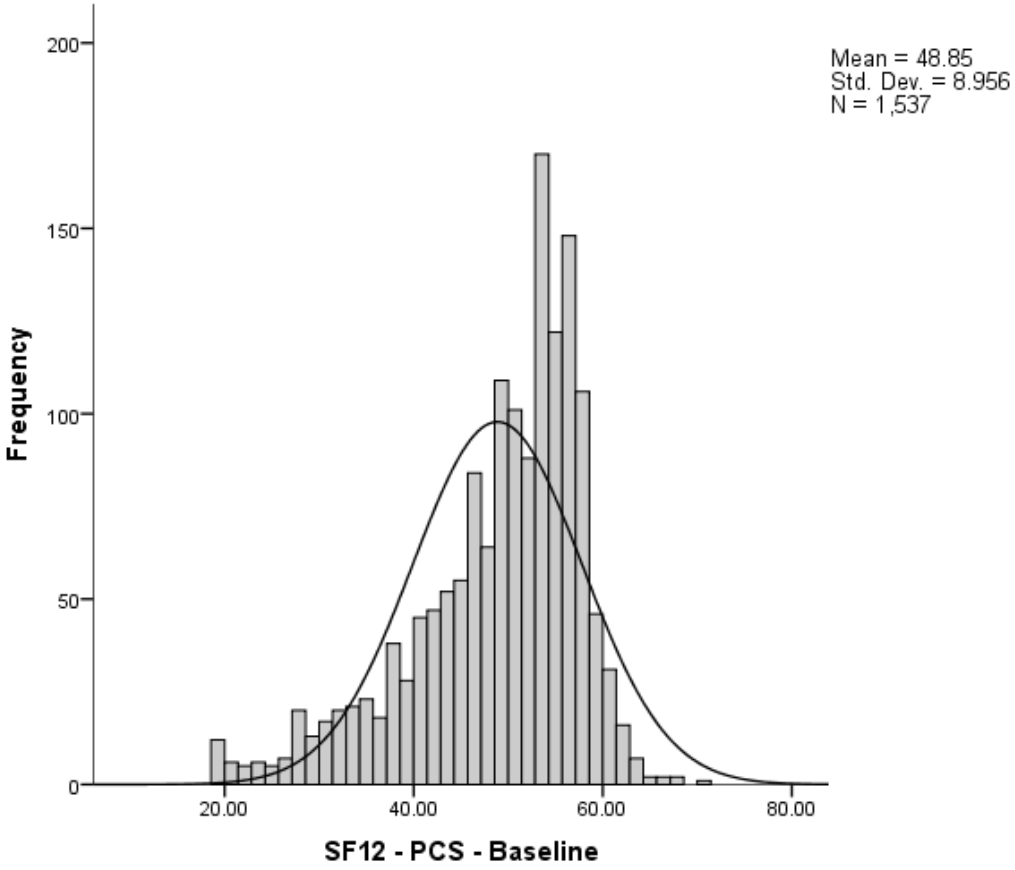


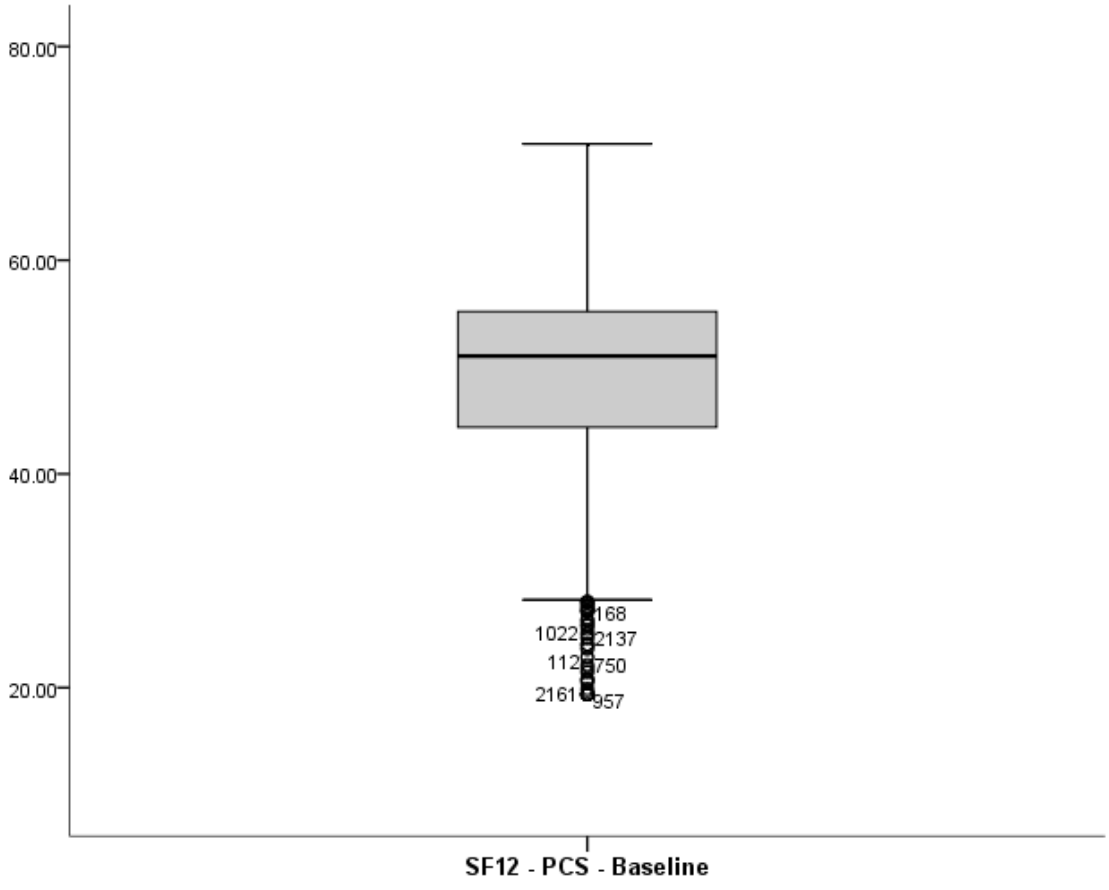
Diastolic Blood Pressure



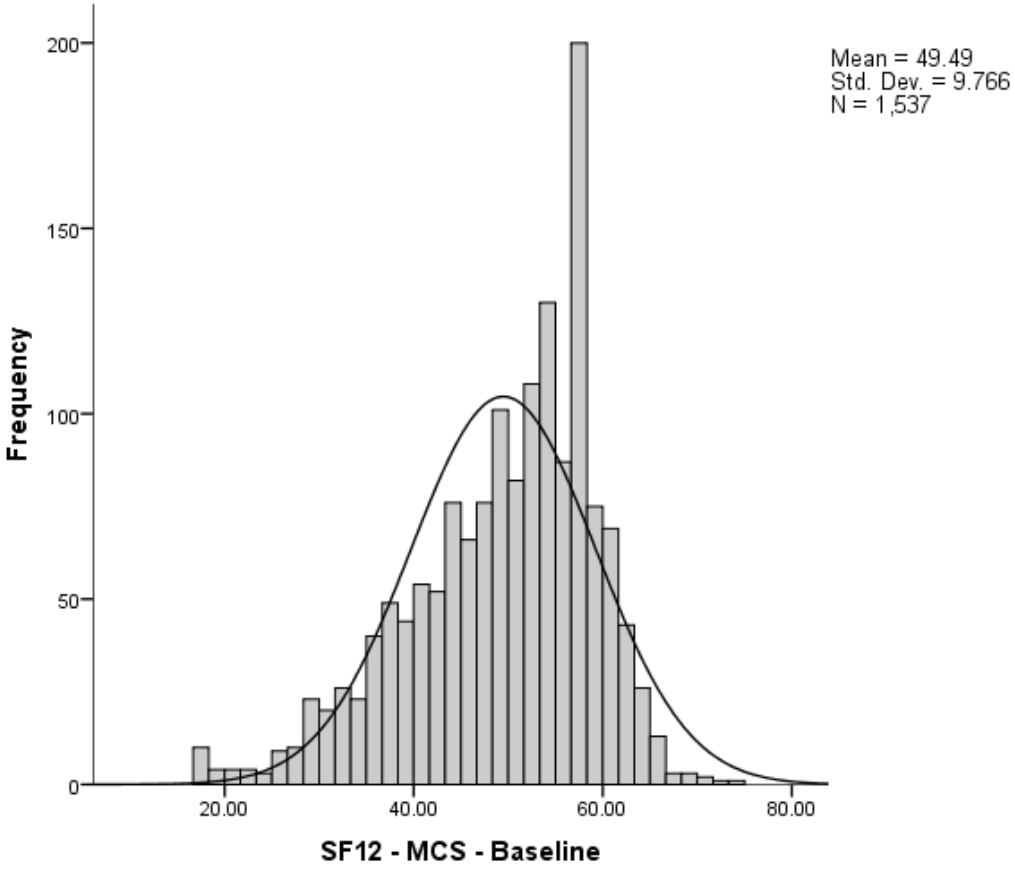


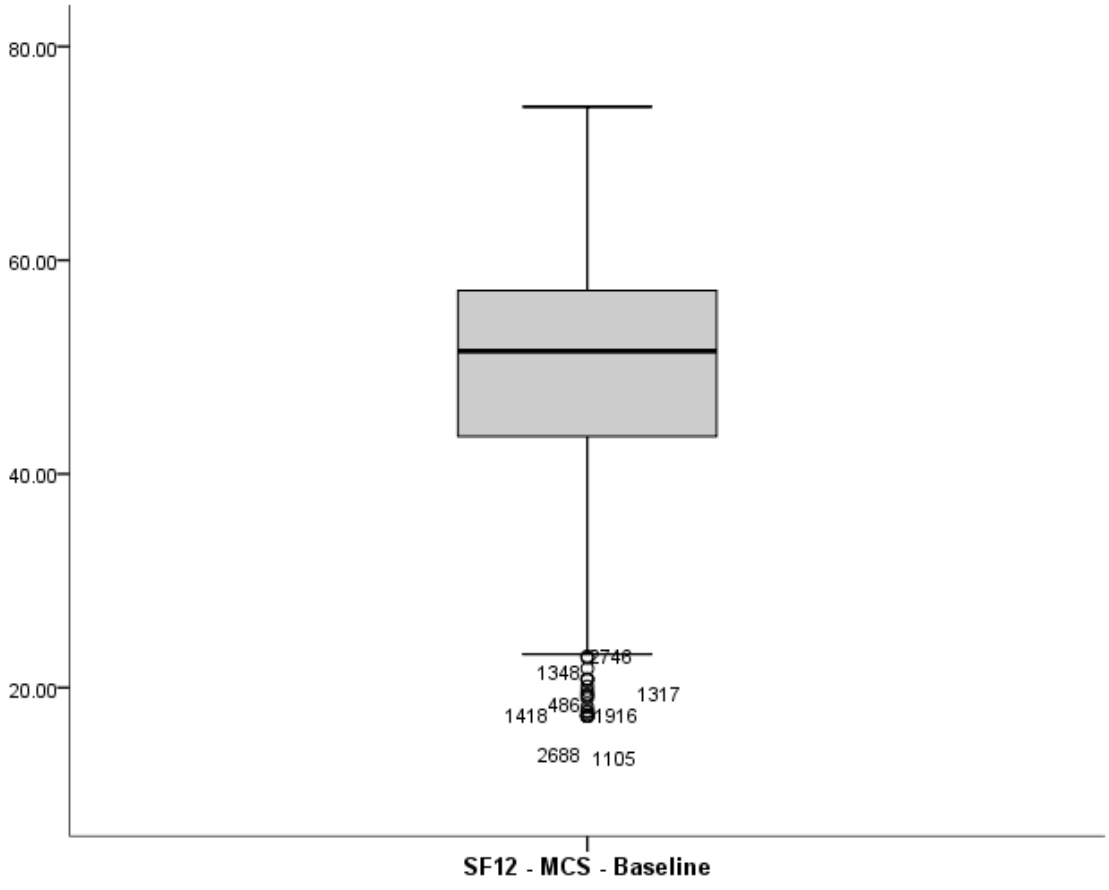
SF12v2 Health State – Physical Component Score



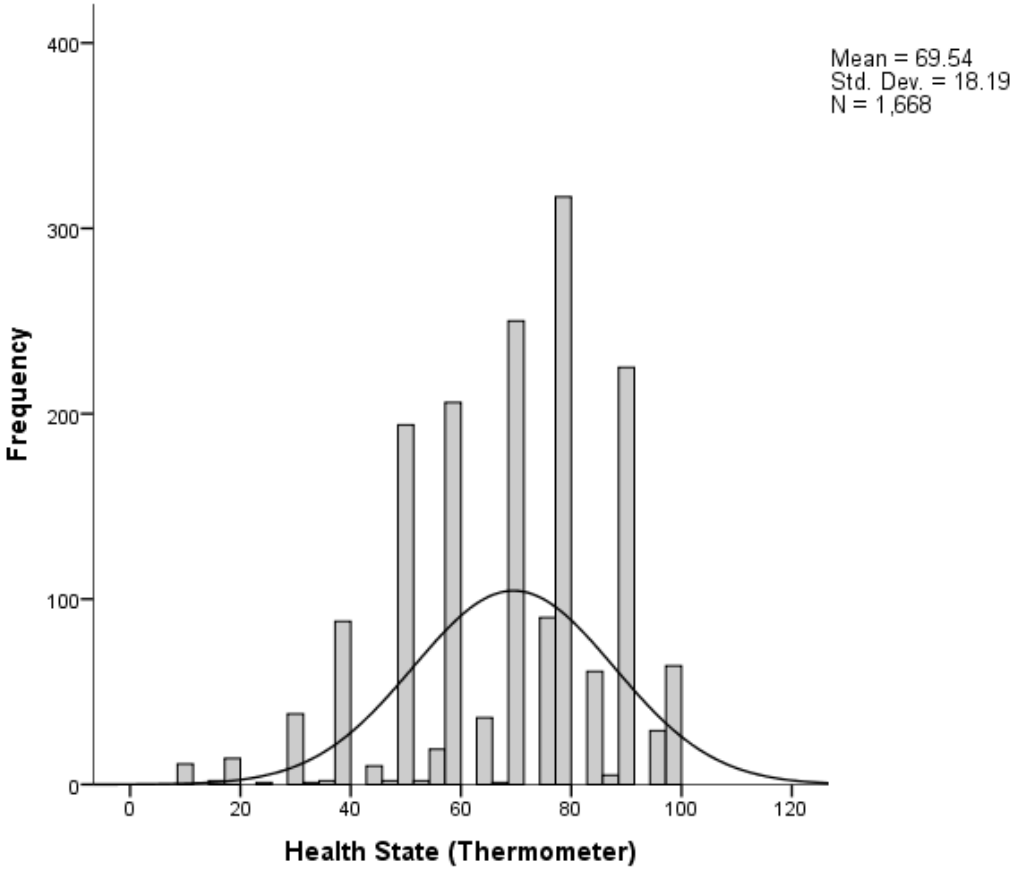


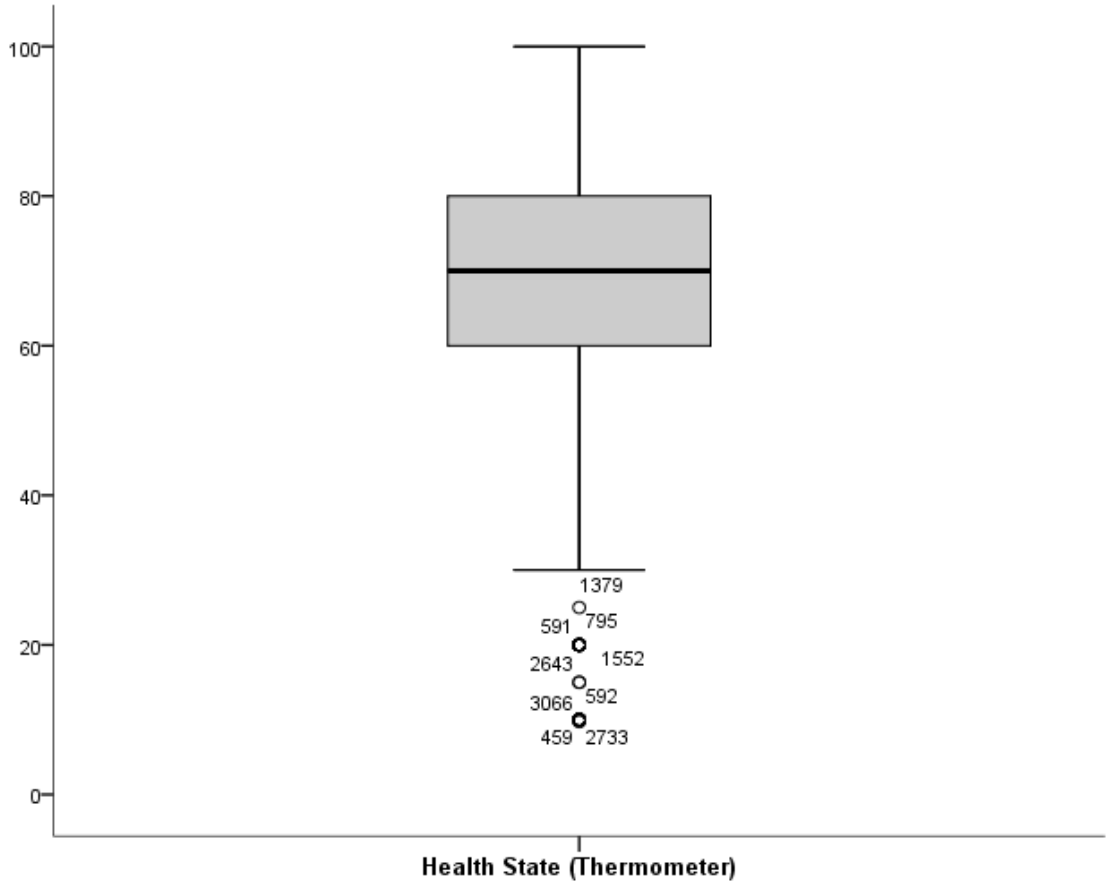
SF12v2 Health State – Mental Component Score



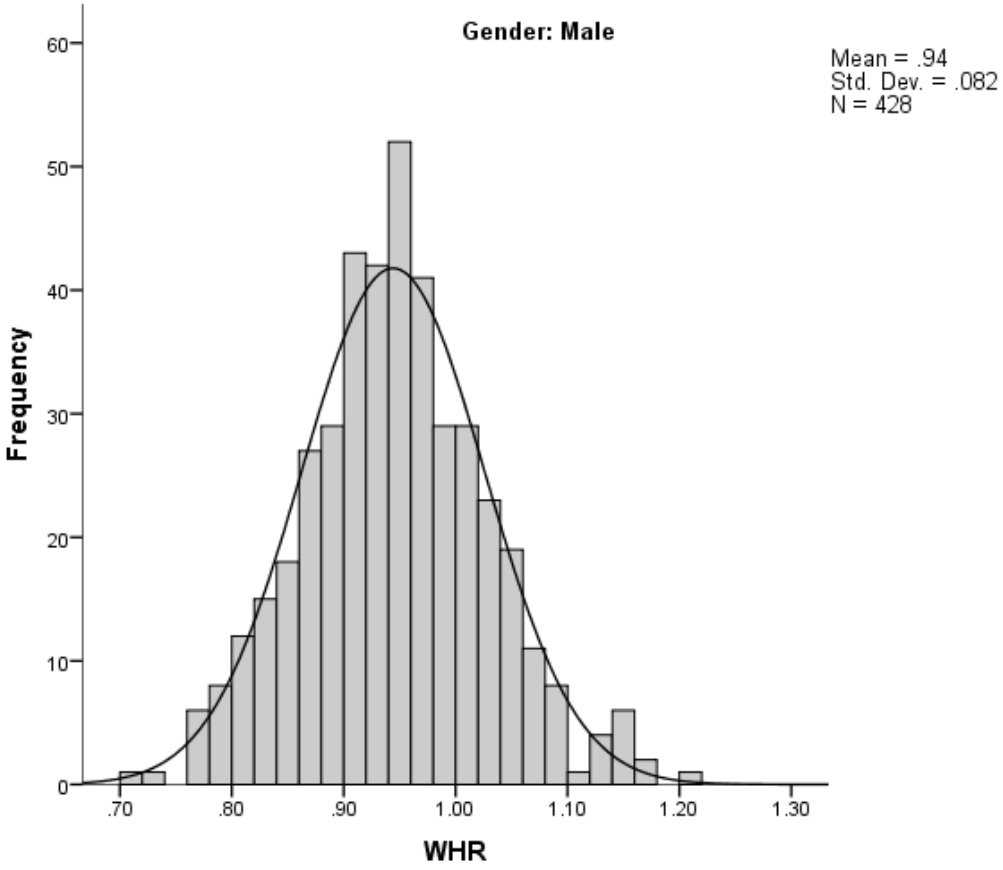


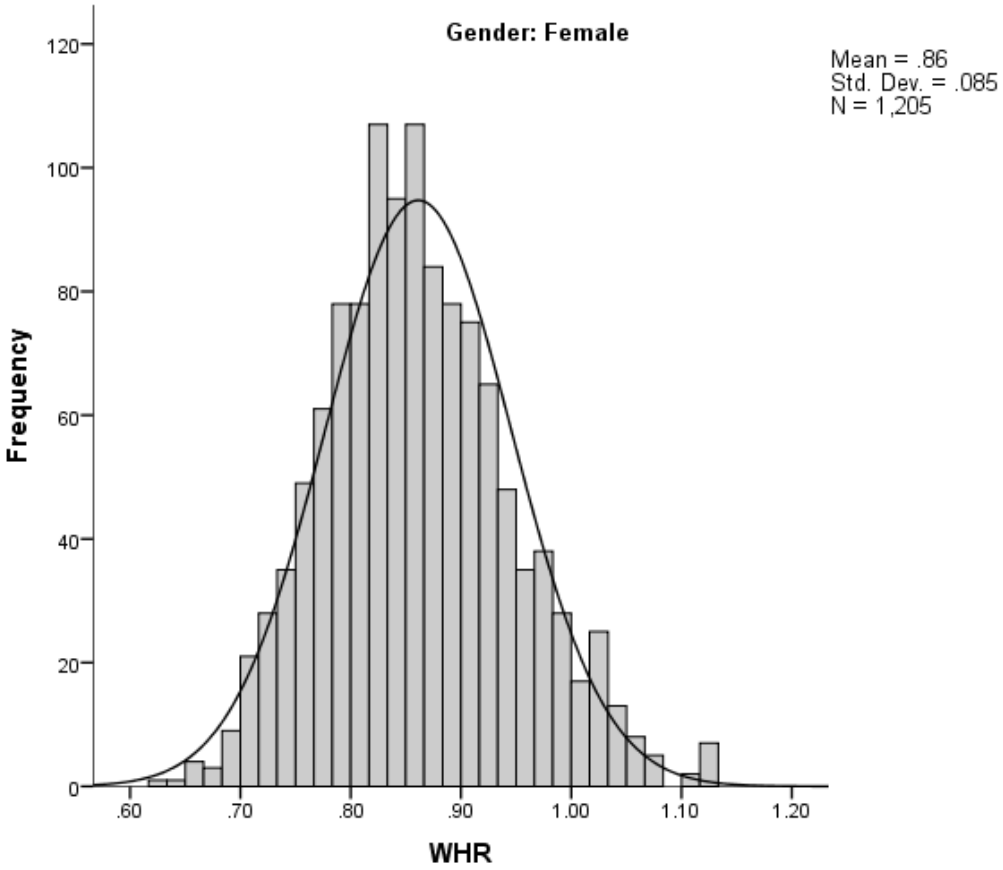
EQ-5D Health State (VAS)

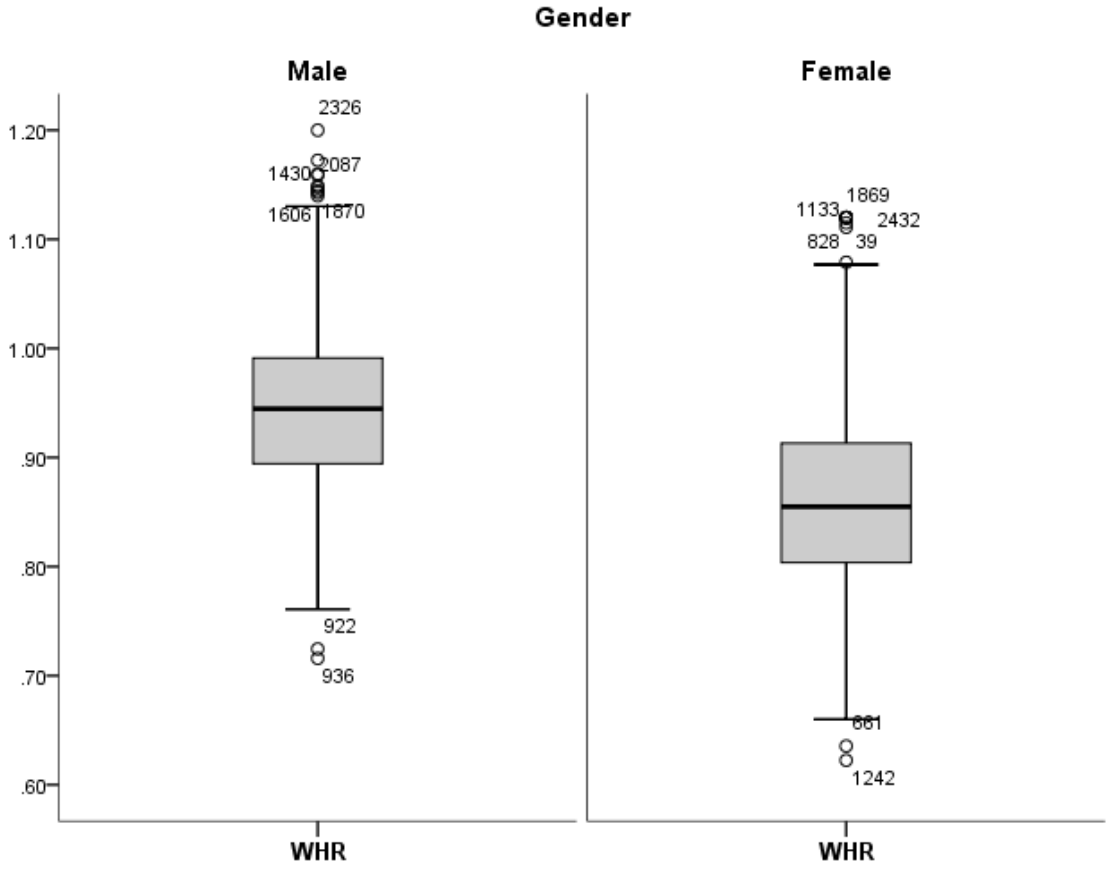




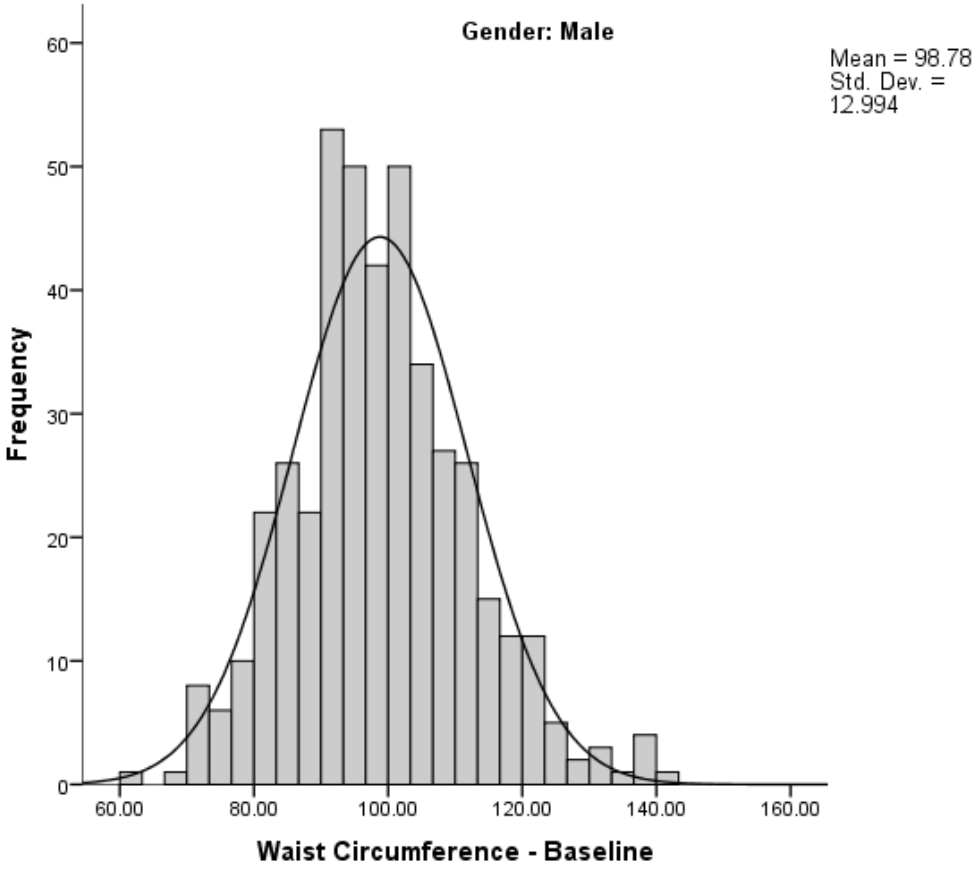
Waist-Hip Ratio (by Gender)

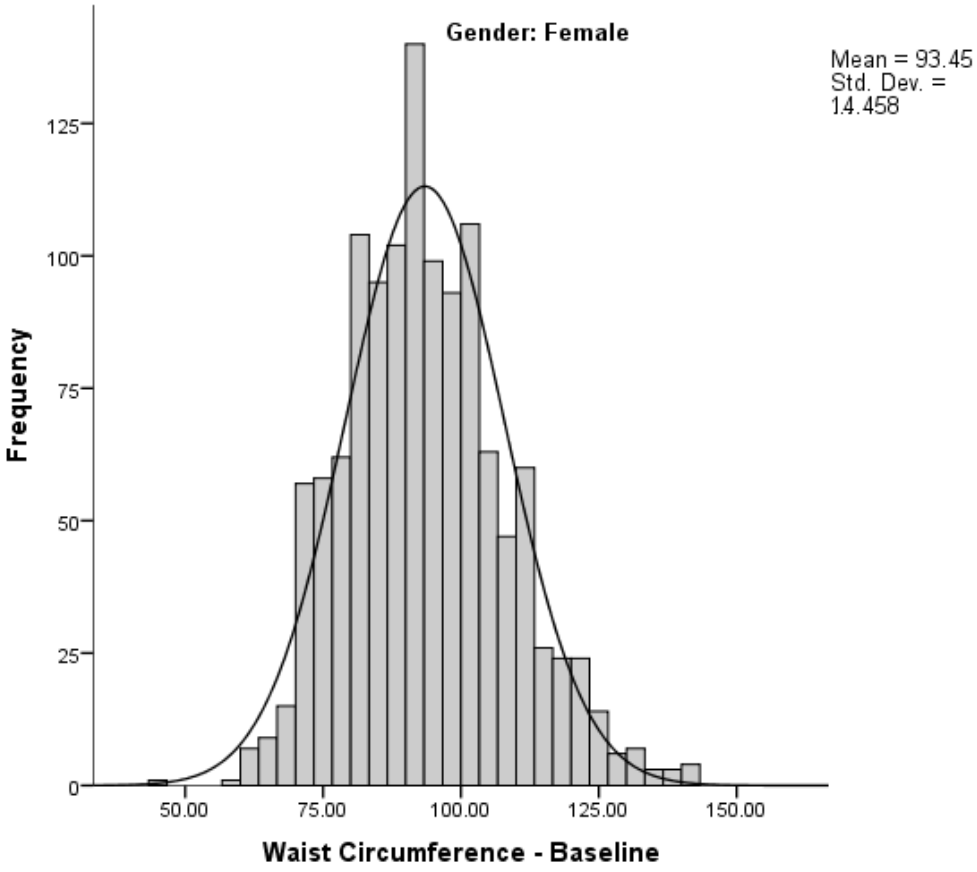






Waist Circumference (by Gender)

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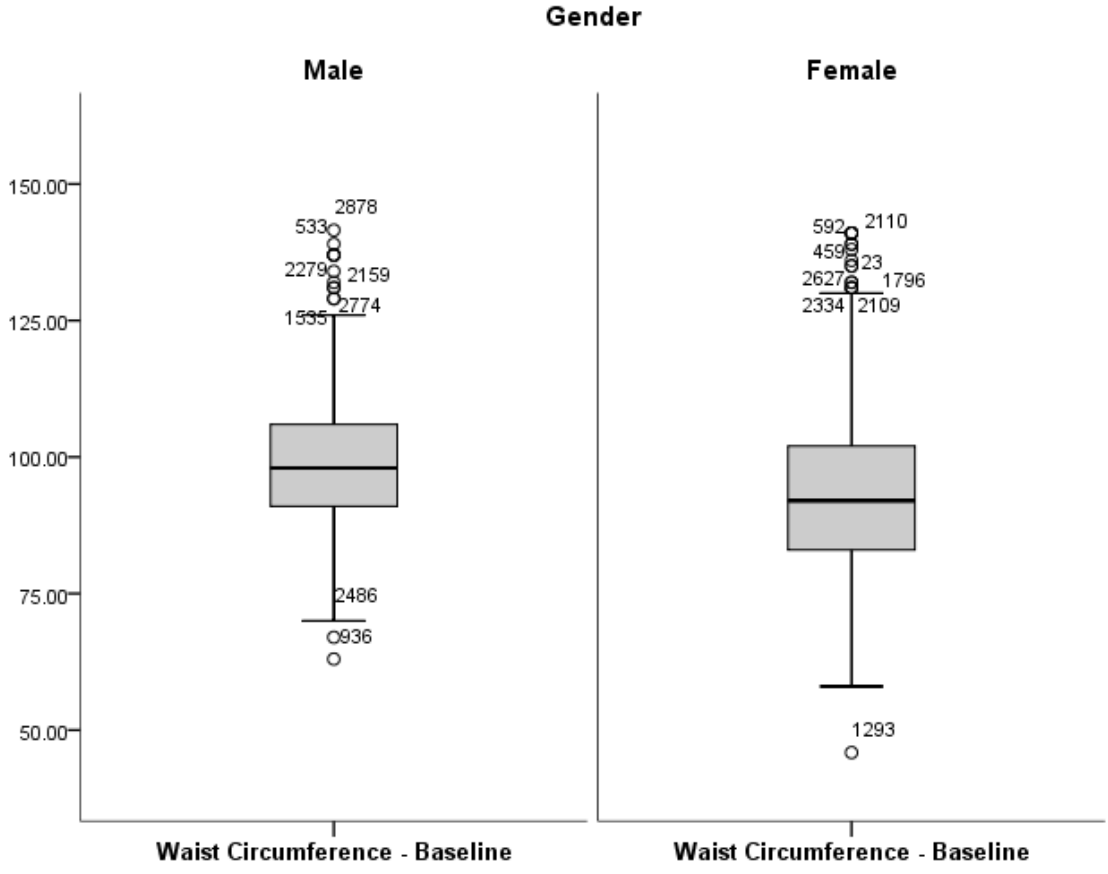
75.00
100.00
125.00
150.00
Waist Circumference - Baseline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Female
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100.00
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50.00
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2279
2159
2774
1535
2486
936
592
2110
459
23
2627
1796
2334
2109
1293
Waist Circumference - Baseline
Waist Circumference - Baseline

Three-Months

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BMI3m	1081	17.31	44.91	28.3610	5.00983
Systolic BP (3 mth)	1081	76	193	134.25	17.759
Diastolic BP (3 mth)	1081	43	115	78.67	10.917
SF12 - PCS - 3 months	1060	22.22	64.85	49.9544	8.41802
SF12 - MCS - 3 months	1060	25.48	72.68	52.6613	8.25216
Health State (Thermometer) (3 mth)	1080	31	100	80.02	14.860
Valid N (listwise)	1059				

Descriptive Statistics

	Variance
BMI3m	25.098
Systolic BP (3 mth)	315.374
Diastolic BP (3 mth)	119.190
SF12 - PCS - 3 months	70.863
SF12 - MCS - 3 months	68.098
Health State (Thermometer) (3 mth)	220.810
Valid N (listwise)	

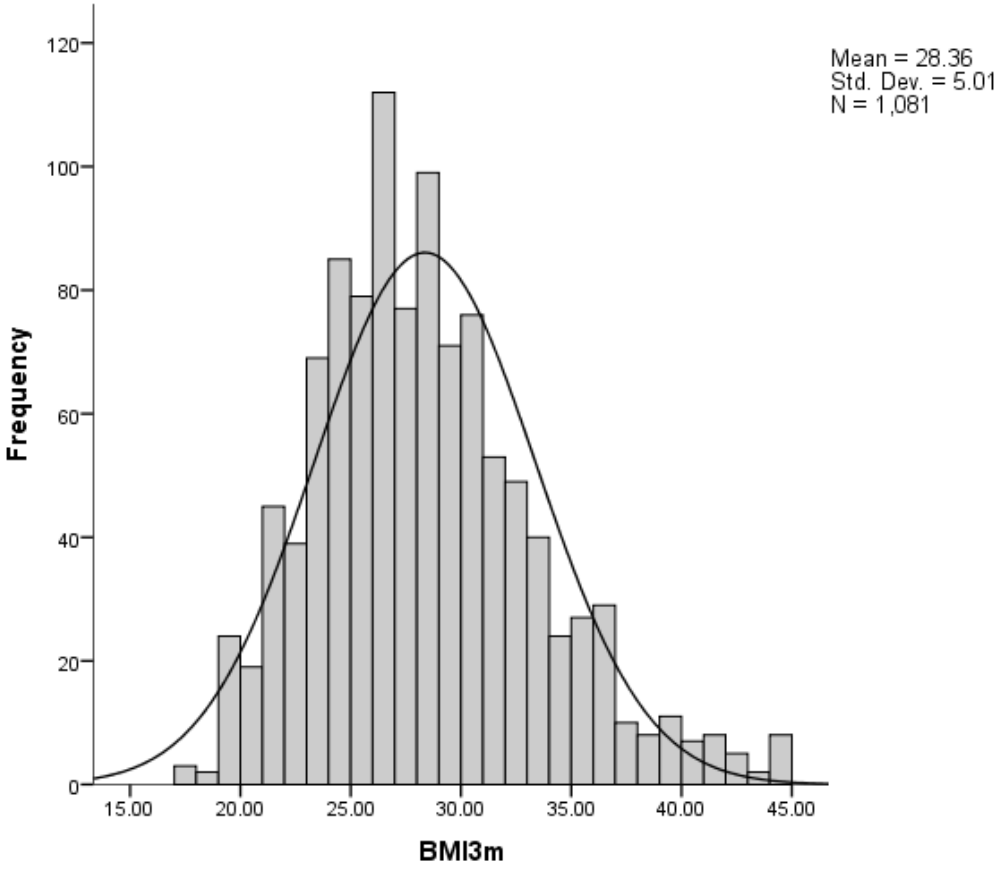
Descriptive Statistics

Gender		N	Minimum	Maximum	Mean
Male	WHR	428	.72	1.20	.9441
	Waist Circumference - Baseline	433	63.00	141.55	98.7842
	Valid N (listwise)	428			
Female	WHR	1205	.62	1.12	.8612
	Waist Circumference - Baseline	1230	45.88	141.02	93.4471
	Valid N (listwise)	1205			

Descriptive Statistics

Gender		Std. Deviation
Male	WHR	.08174
	Waist Circumference - Baseline	12.99375
	Valid N (listwise)	
Female	WHR	.08456
	Waist Circumference - Baseline	14.45778
	Valid N (listwise)	

BMI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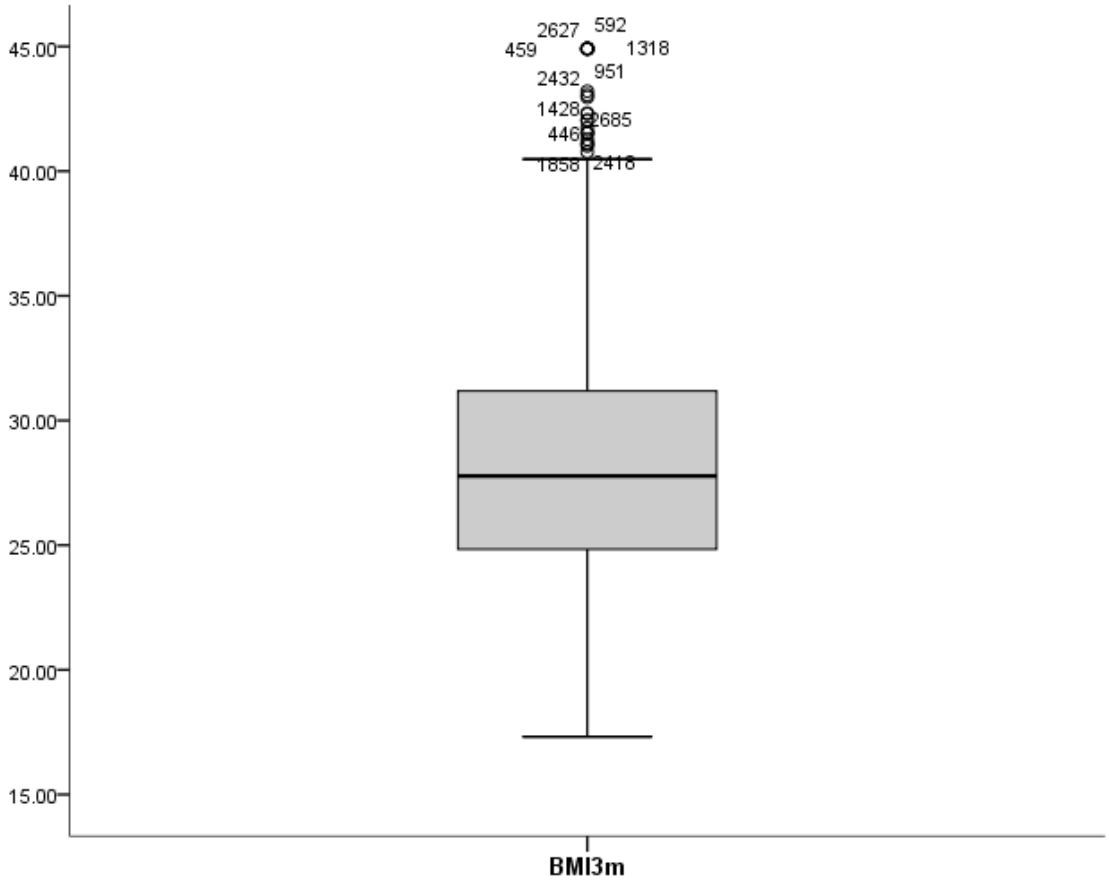
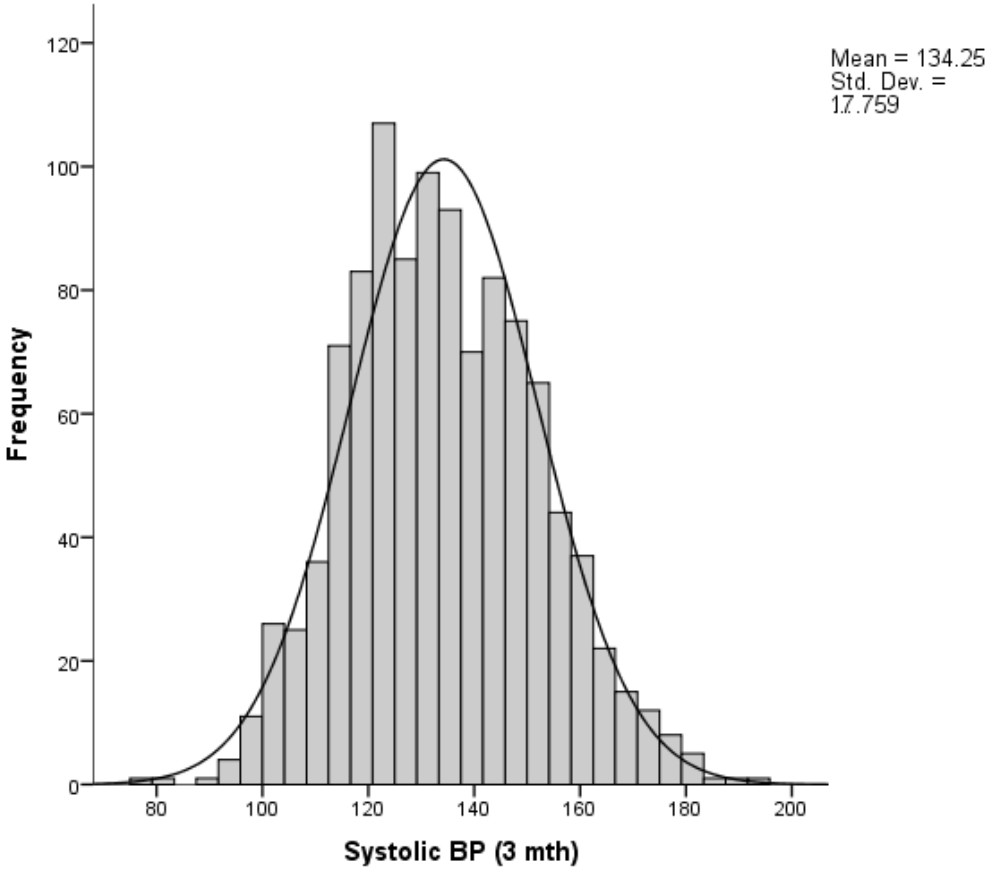
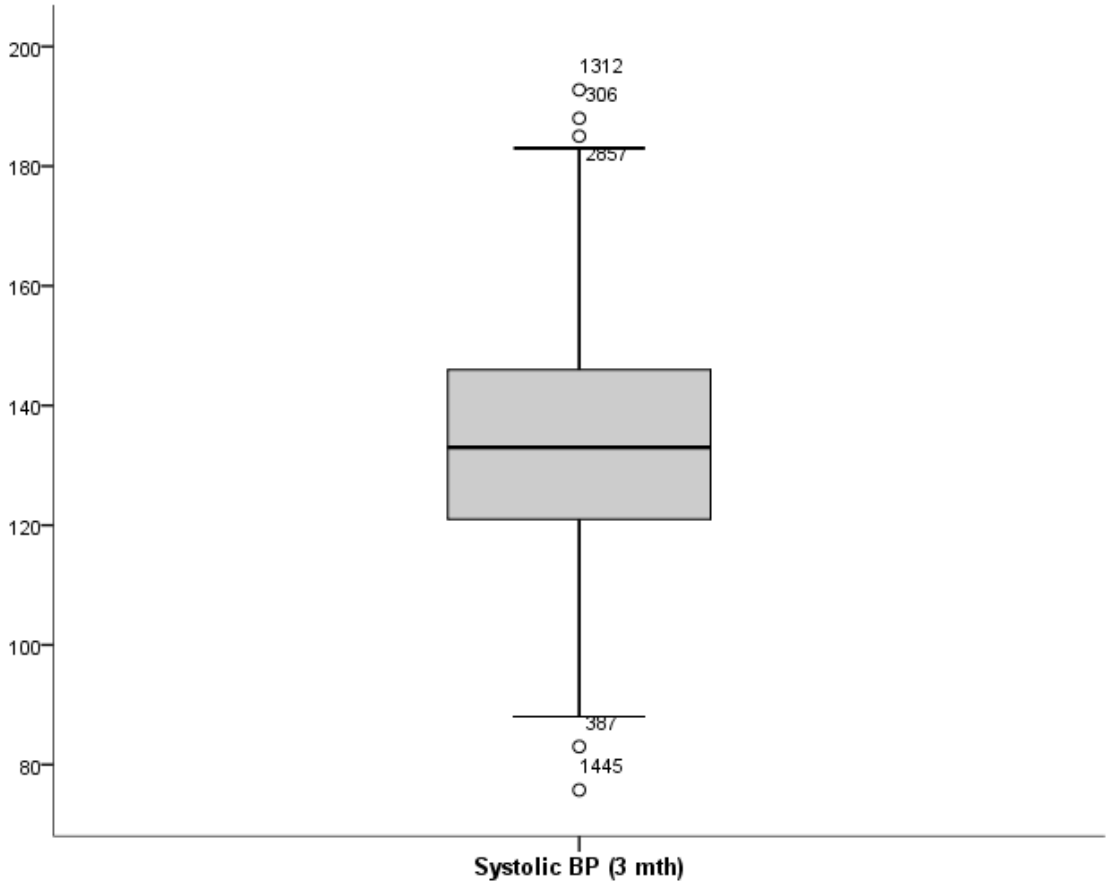
N = 1,081
Frequency
BMI3m

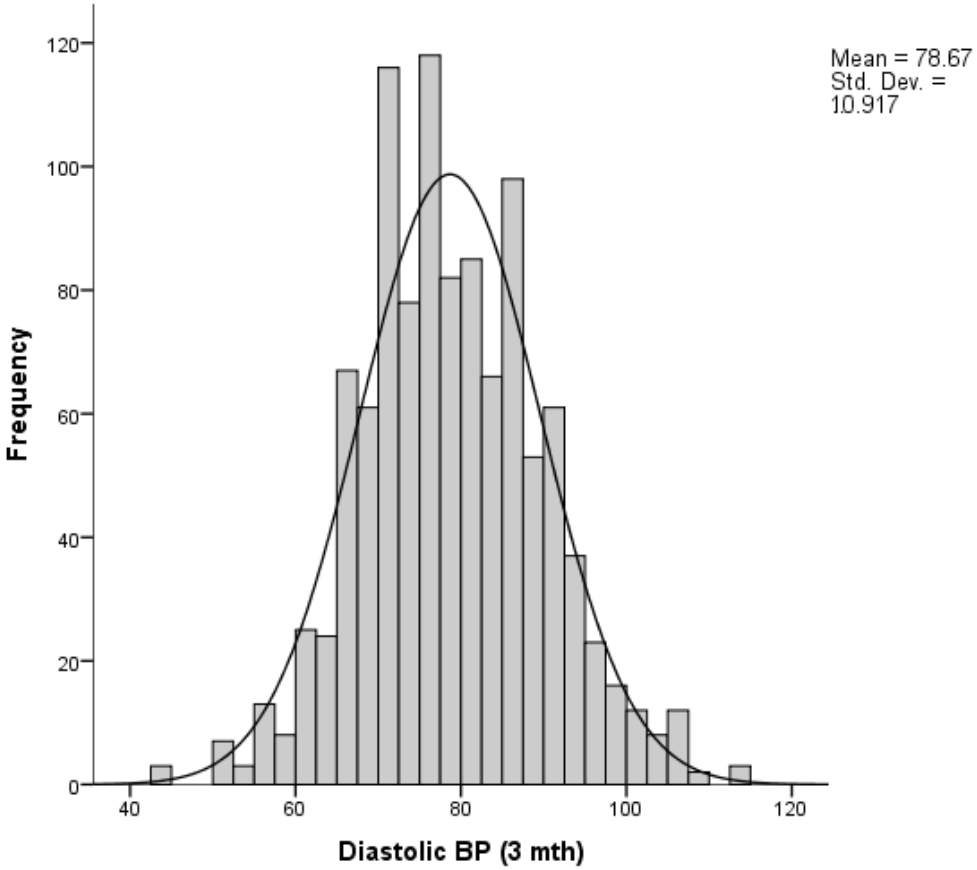

2627
592
459
1318
2432
951
1428
2685
1858
2418
BMI3m

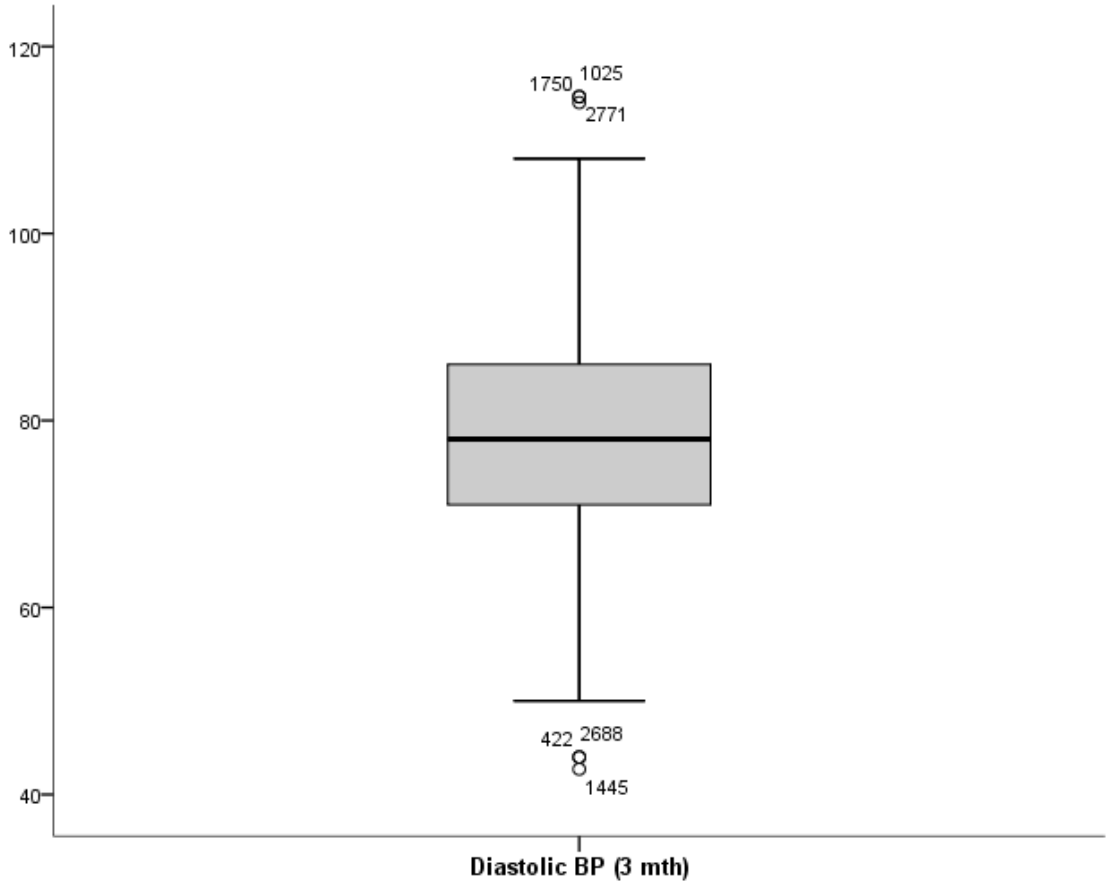
Systolic Blood Pressure



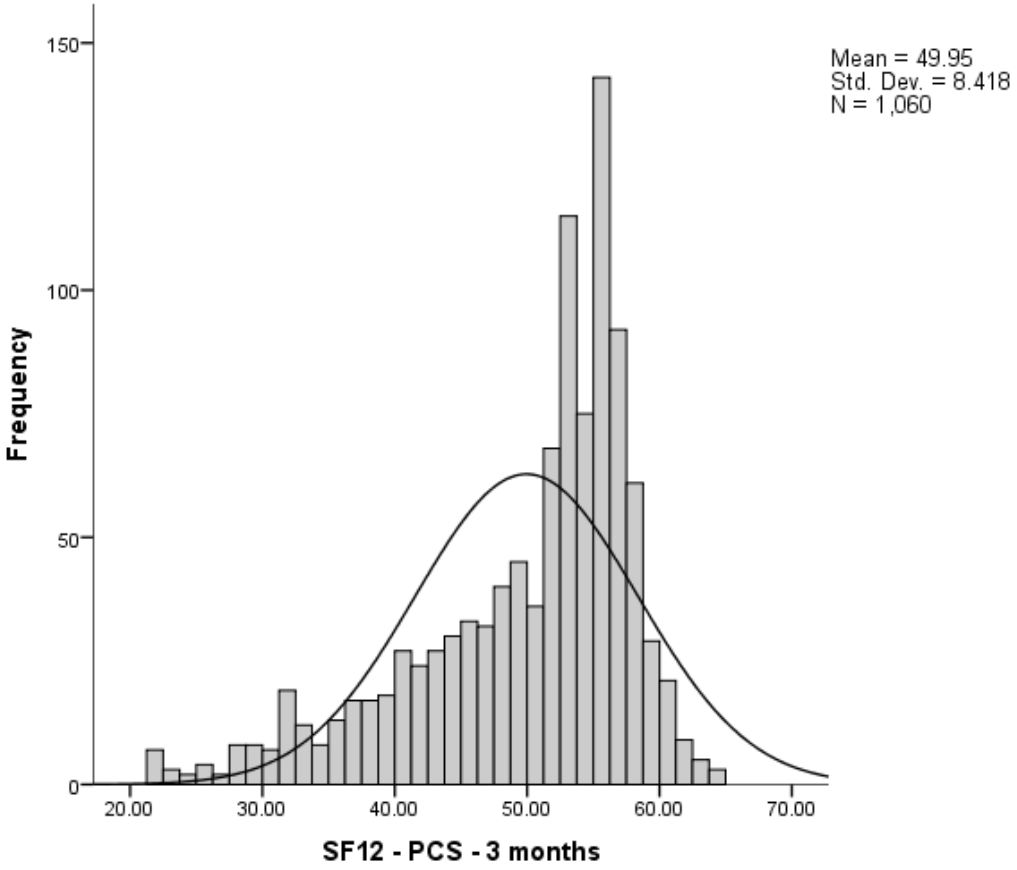


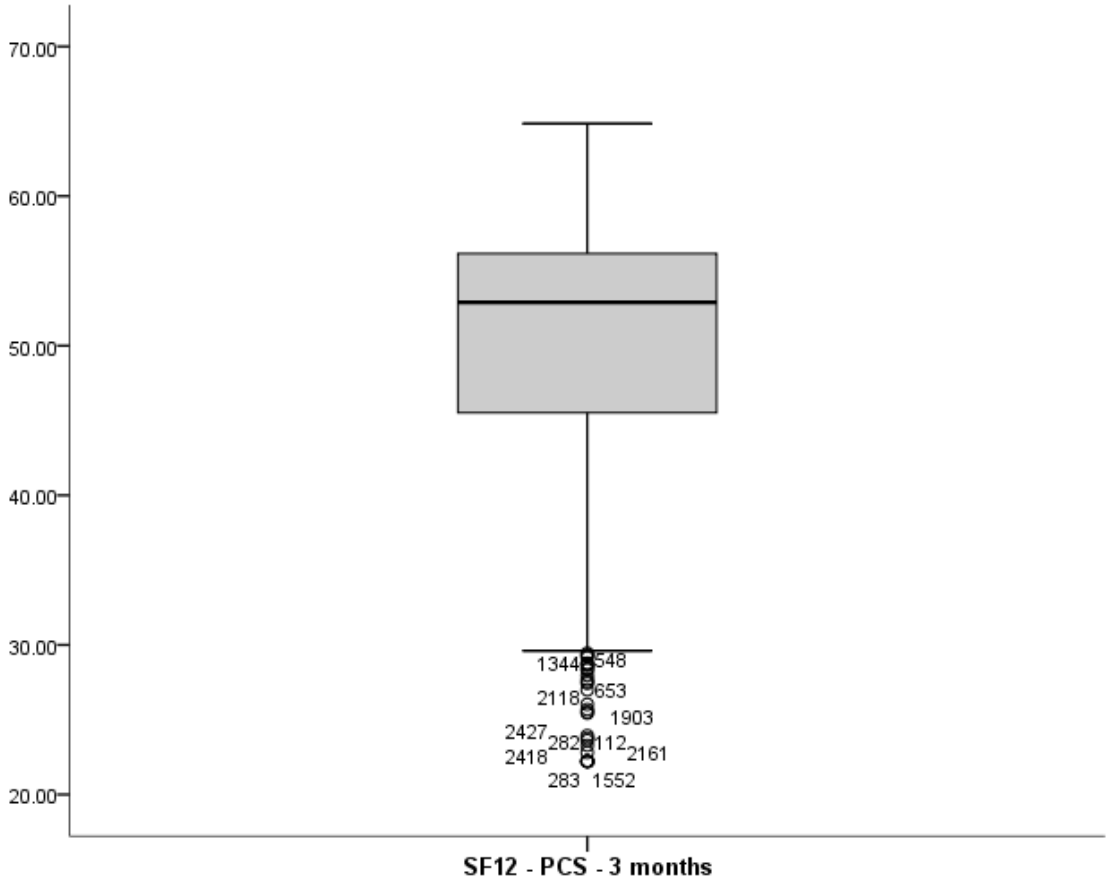
Diastolic Blood Pressure



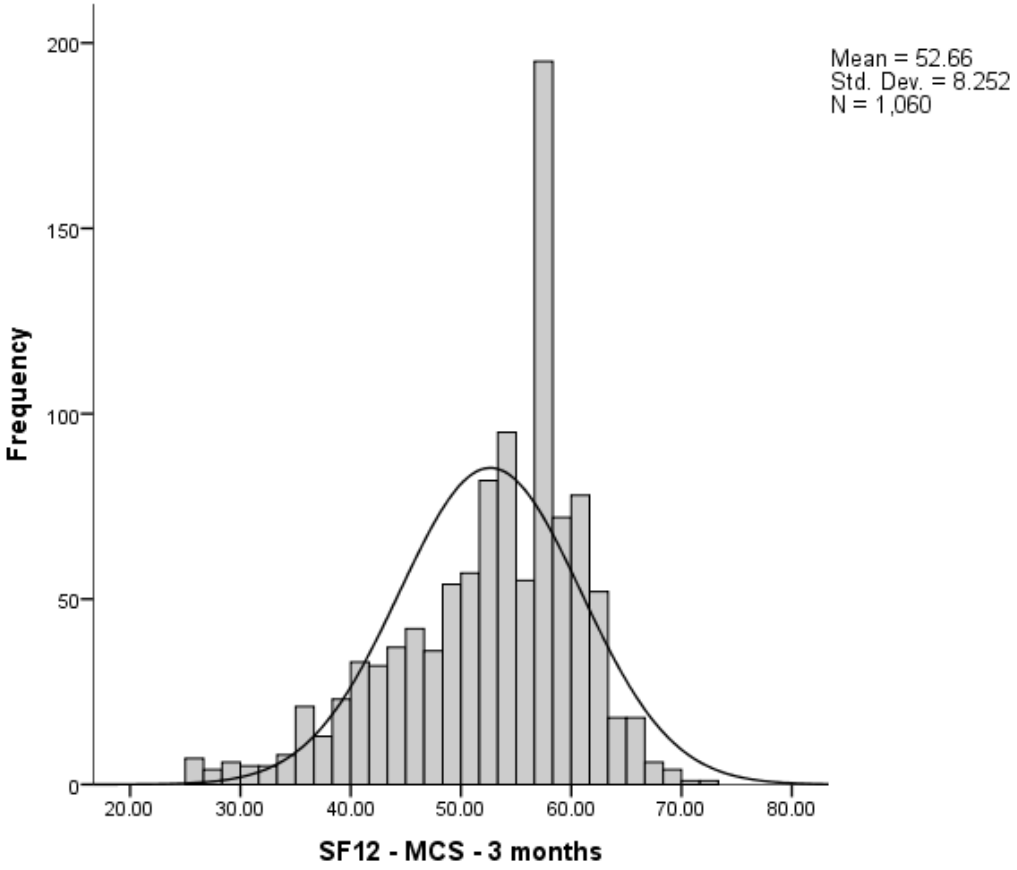


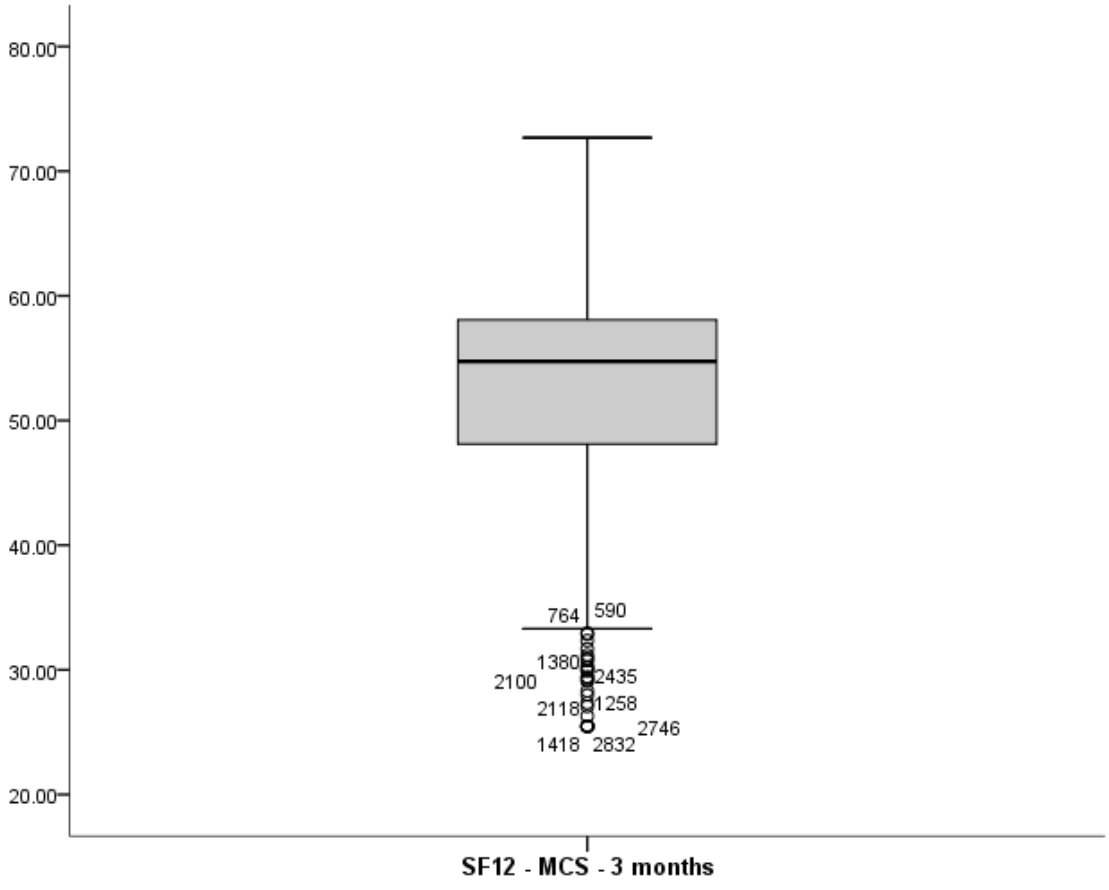
SF12v2 Health State – Physical Component Score



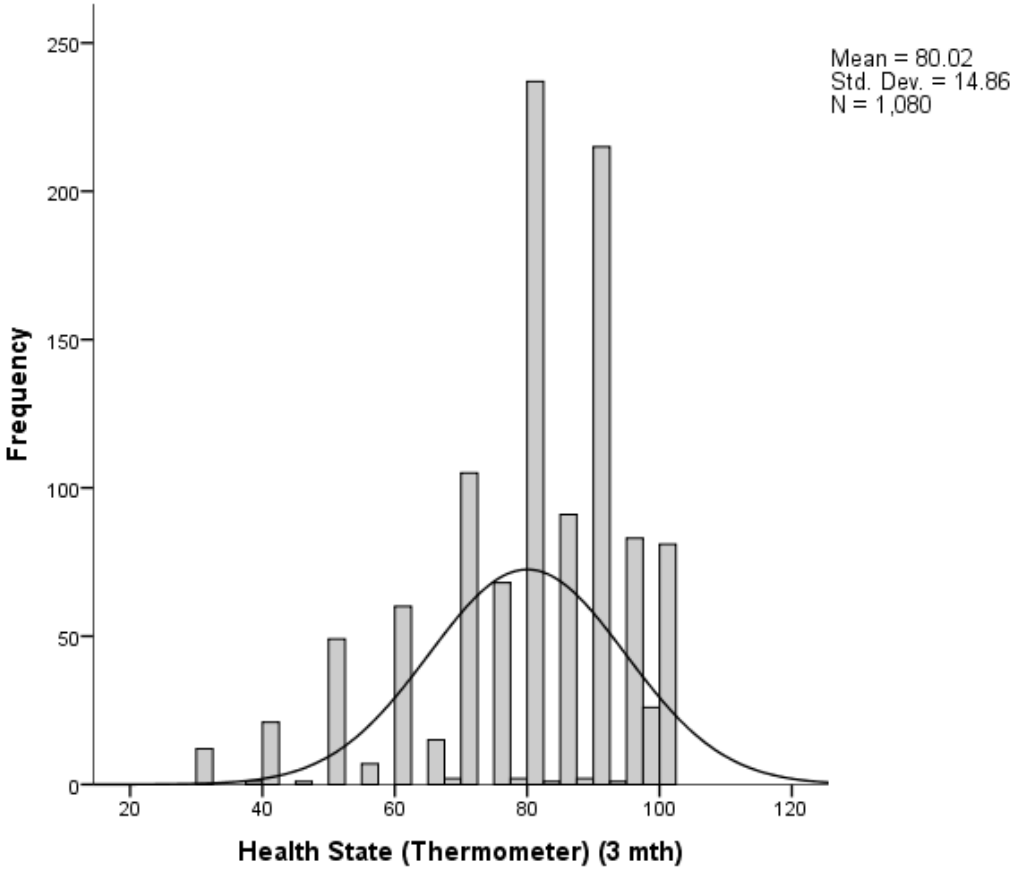


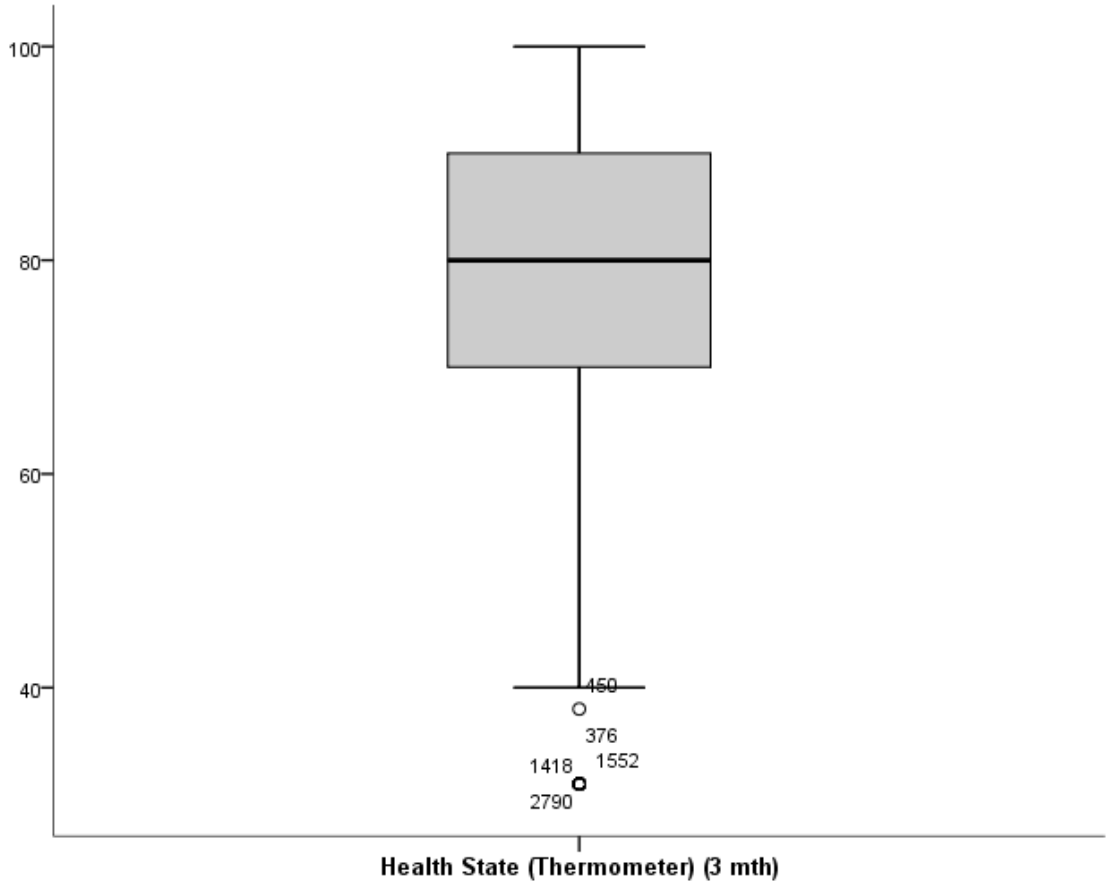
SF12v2 Health State – Mental Component Score



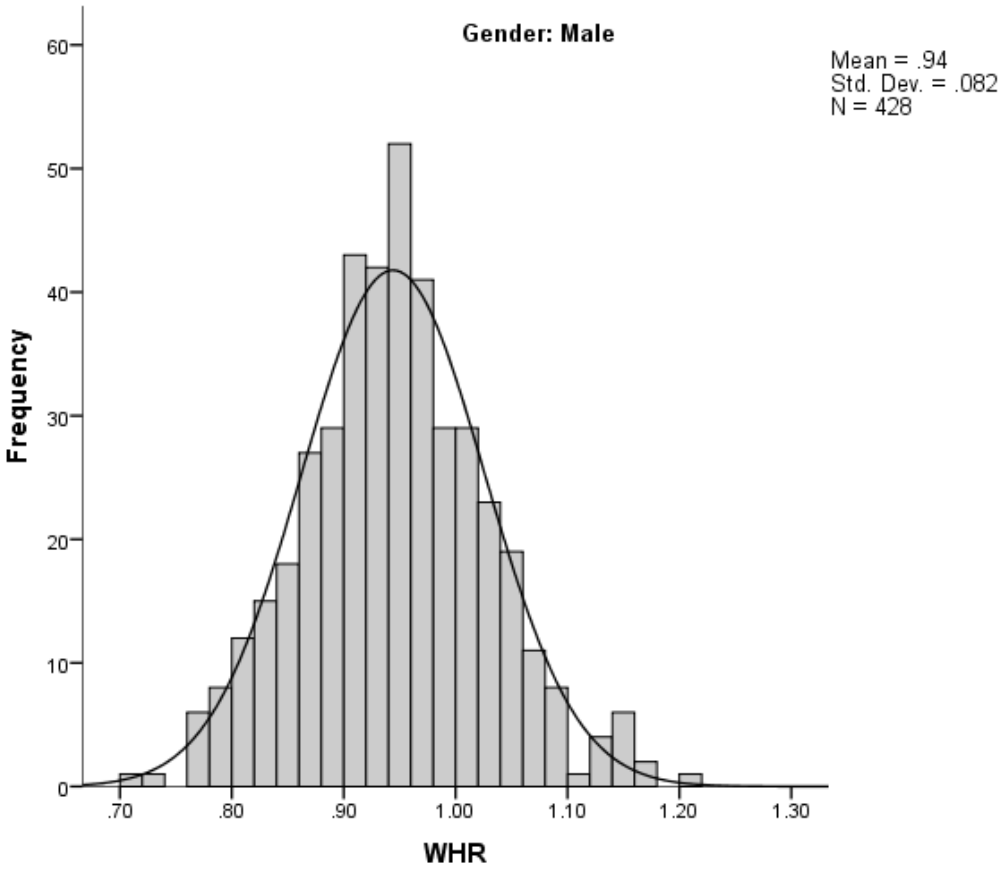


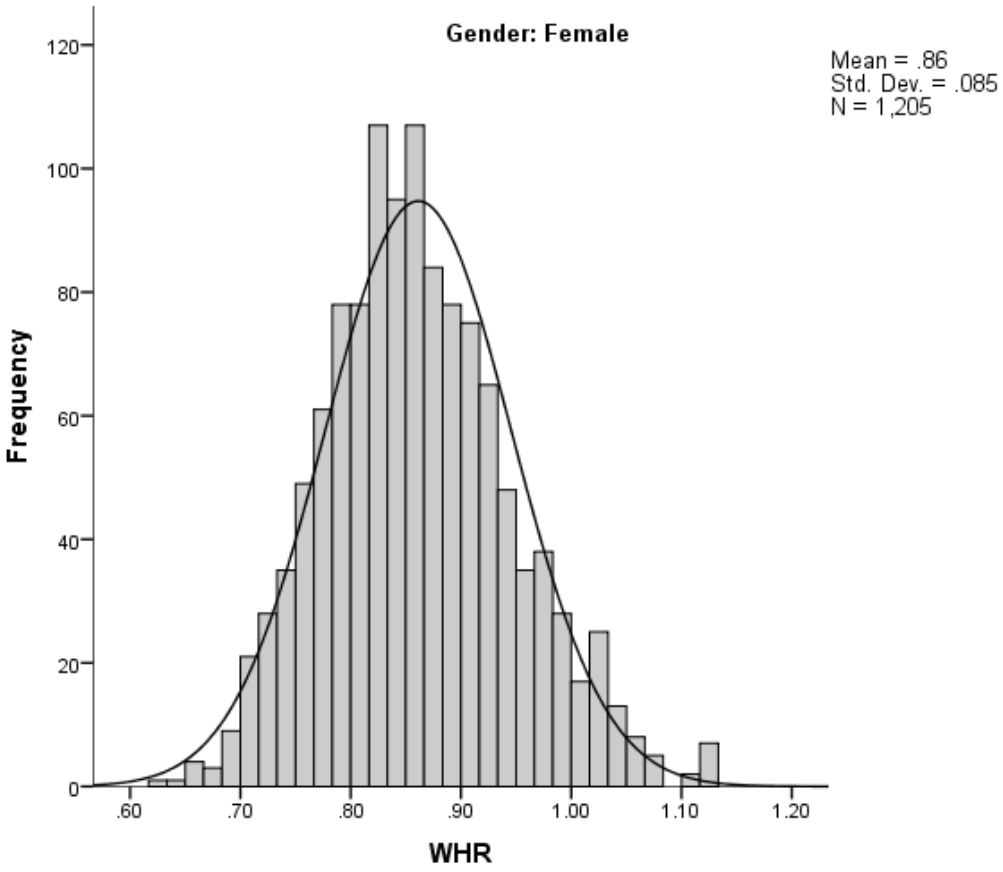
EQ-5D Health State (VAS)

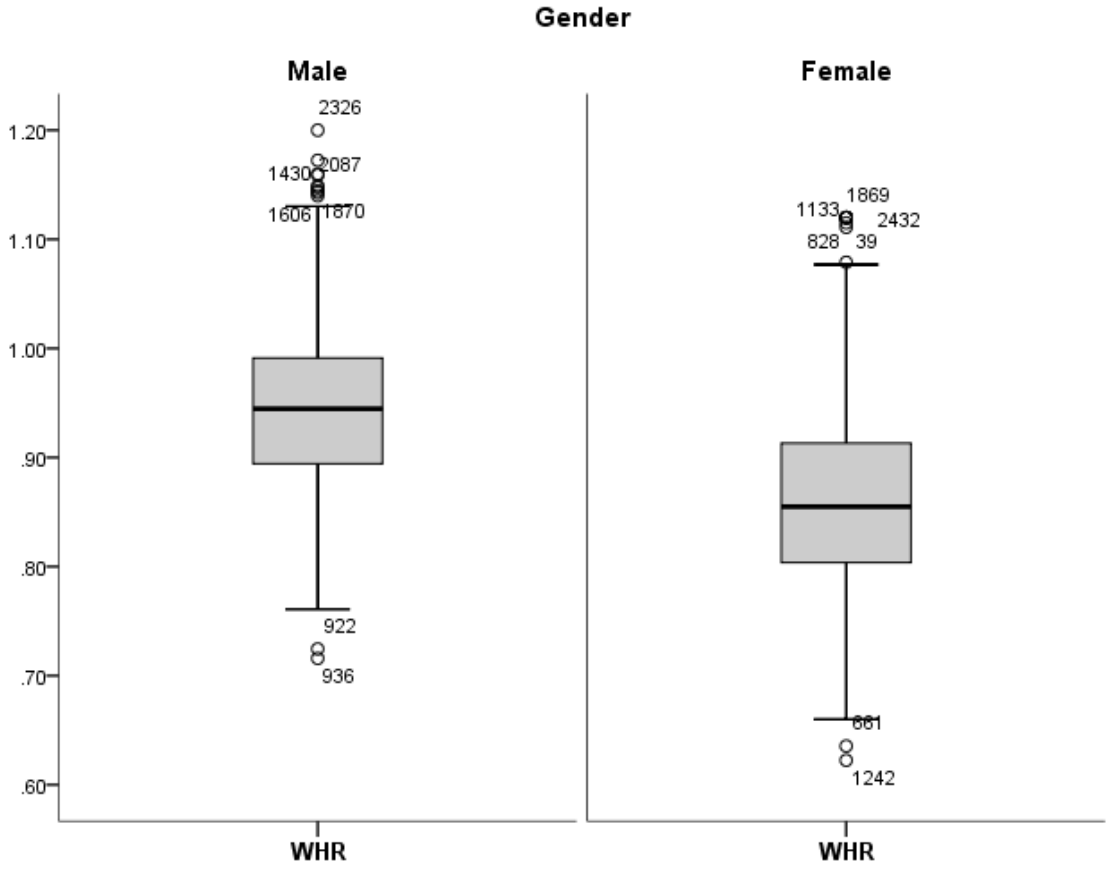




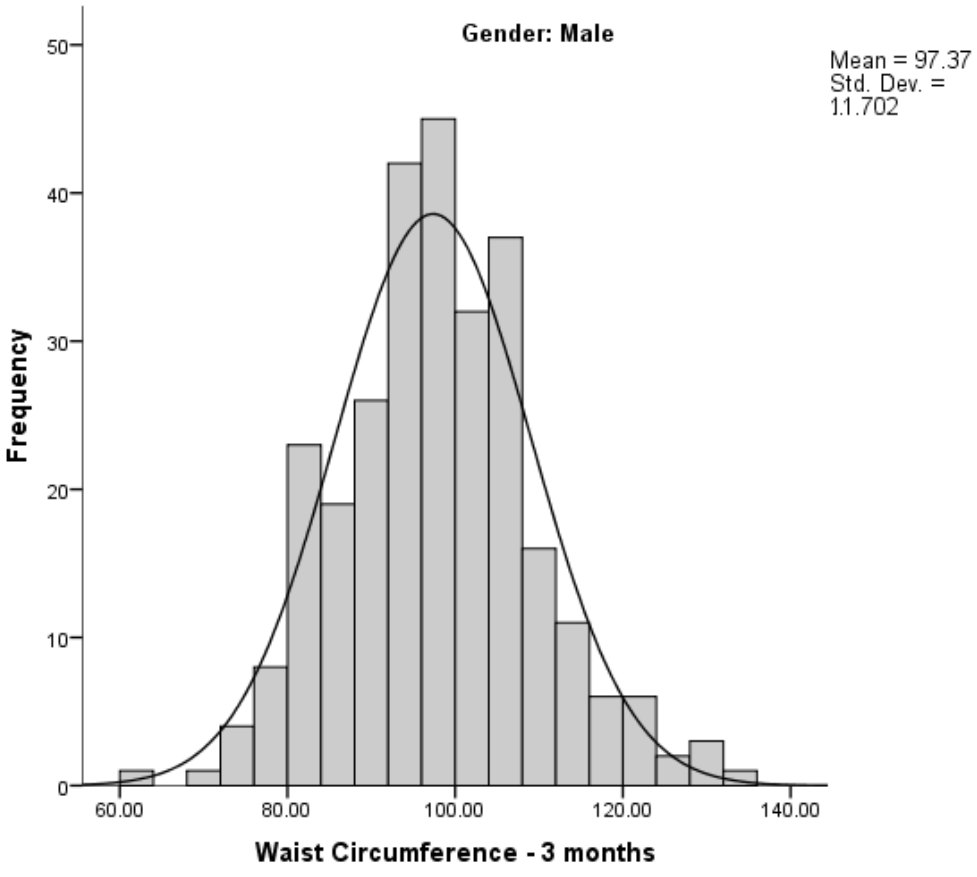
Waist-Hip Ratio (by Gender)

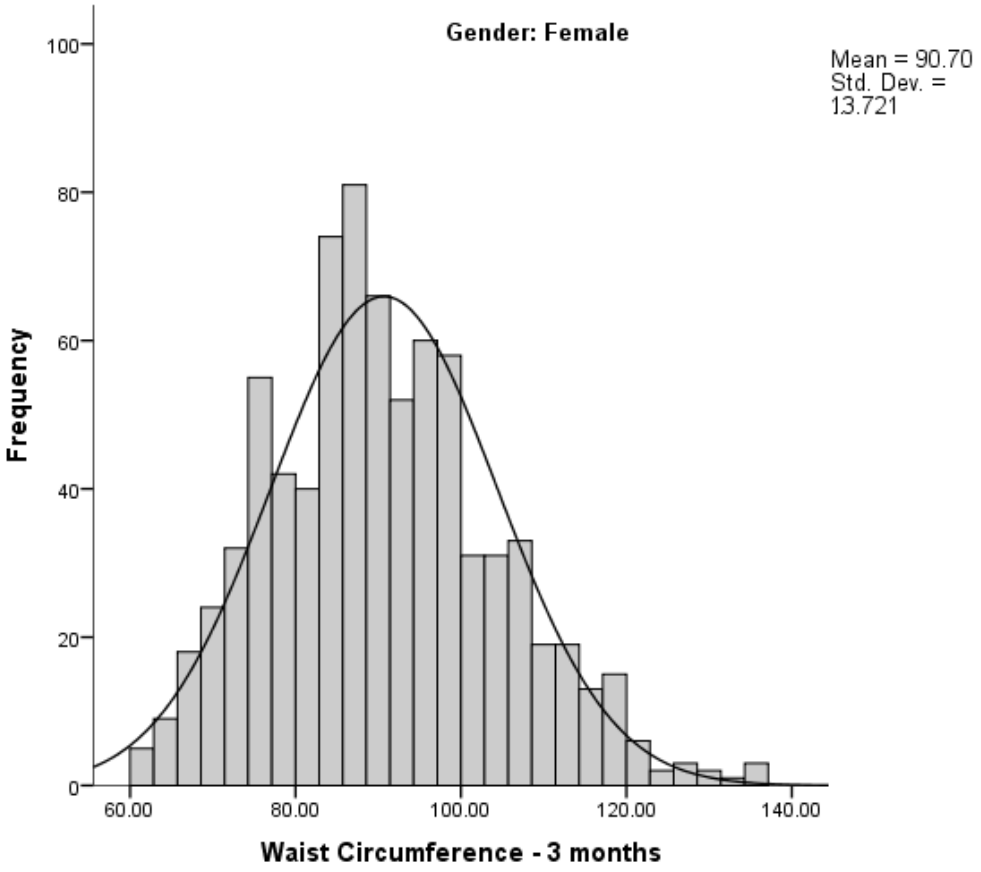






Waist Circumference (by Gender)

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0
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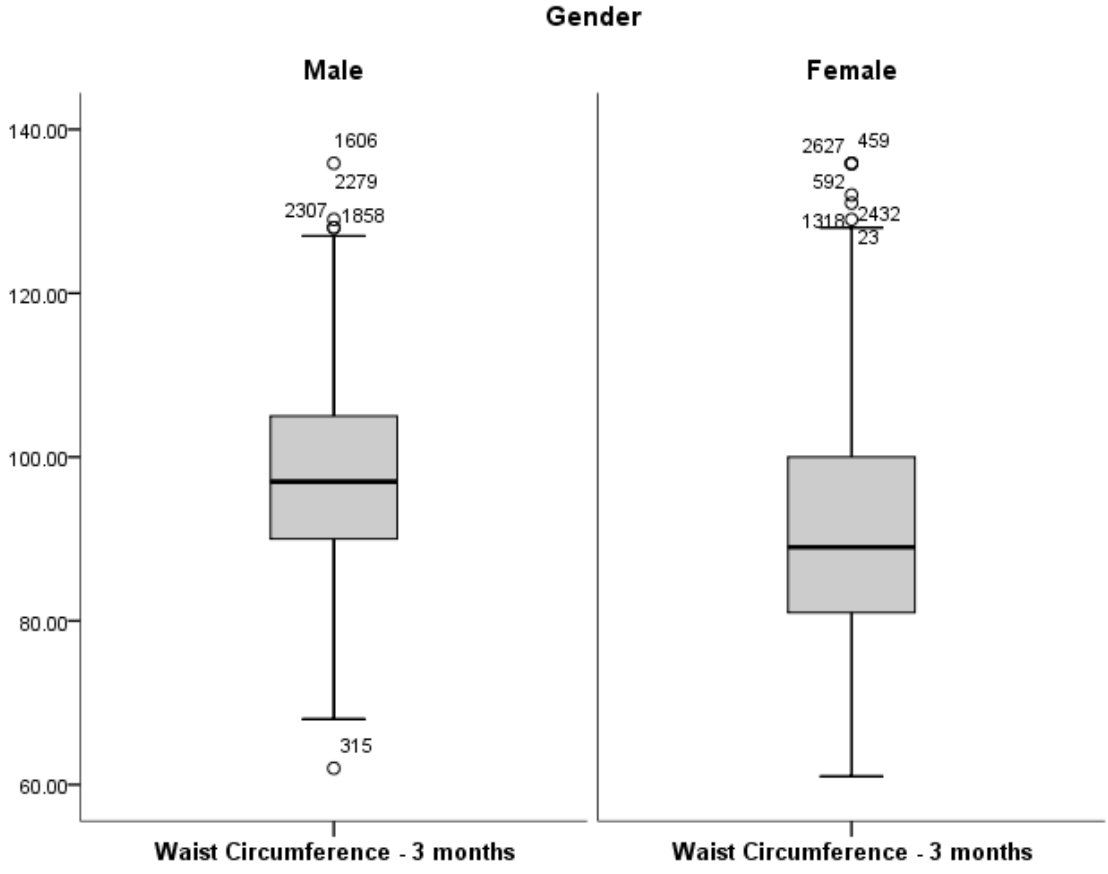
80.00
100.00
120.00
140.00
Waist Circumference - 3 months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Female
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100.00
80.00
60.00
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2279
2307
1858
315
2627
459
592
2432
23
Waist Circumference - 3 months
Waist Circumference - 3 months

Six-Months

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BMI6m	135	18.83	44.95	28.0000	5.10305
Systolic BP (6 mth)	135	93	184	134.04	17.958
Diastolic BP (6 mth)	135	46	98	76.85	9.741
SF12 - PCS - 6 months	135	22.50	64.51	50.6598	8.55180
SF12 - MCS - 6 months	135	25.360	66.290	53.19585	8.427378
Health State (Thermometer) (6 mth)	135	31	100	79.04	14.496
Valid N (listwise)	135				

Descriptive Statistics

	Variance
BMI6m	26.041
Systolic BP (6 mth)	322.491
Diastolic BP (6 mth)	94.888
SF12 - PCS - 6 months	73.133
SF12 - MCS - 6 months	71.021
Health State (Thermometer) (6 mth)	210.148
Valid N (listwise)	

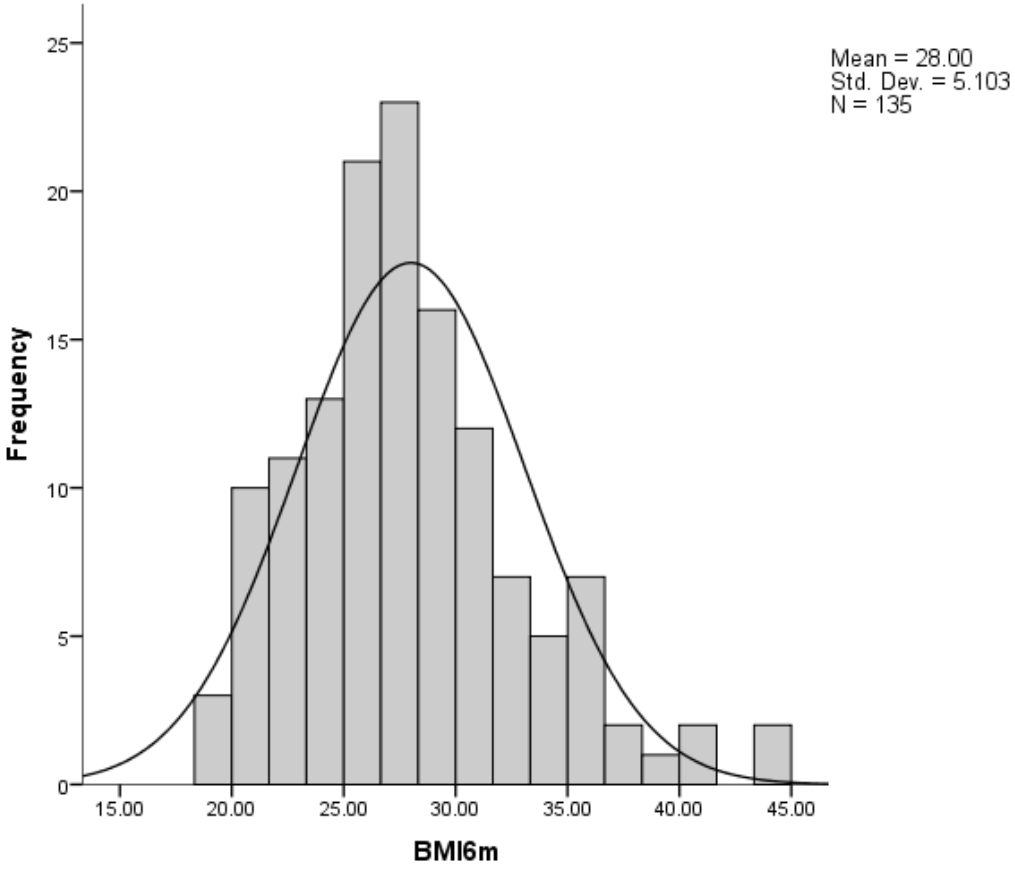
Descriptive Statistics

Gender		N	Minimum	Maximum	Mean
Male	WHR 6 months	36	.81	1.19	.9582
	Waist Circumference - 6 months	36	81.00	122.00	98.0278
	Valid N (listwise)	36			
Female	WHR 6 months	99	.71	1.09	.8757
	Waist Circumference - 6 months	99	68.00	138.00	93.0354
	Valid N (listwise)	99			

Descriptive Statistics

Gender		Std. Deviation
Male	WHR 6 months	.07899
	Waist Circumference - 6 months	10.56270
	Valid N (listwise)	
Female	WHR 6 months	.08537
	Waist Circumference - 6 months	14.38080
	Valid N (listwise)	

BMI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N = 135
Frequency
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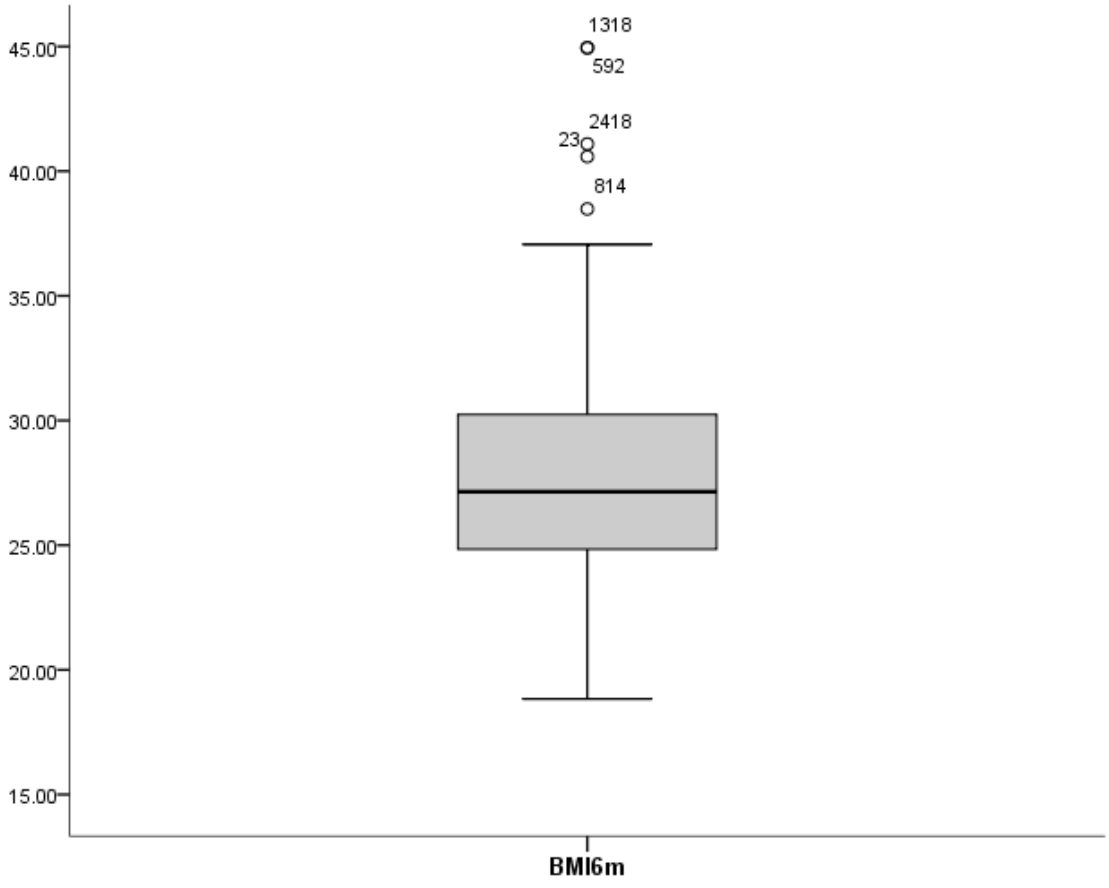
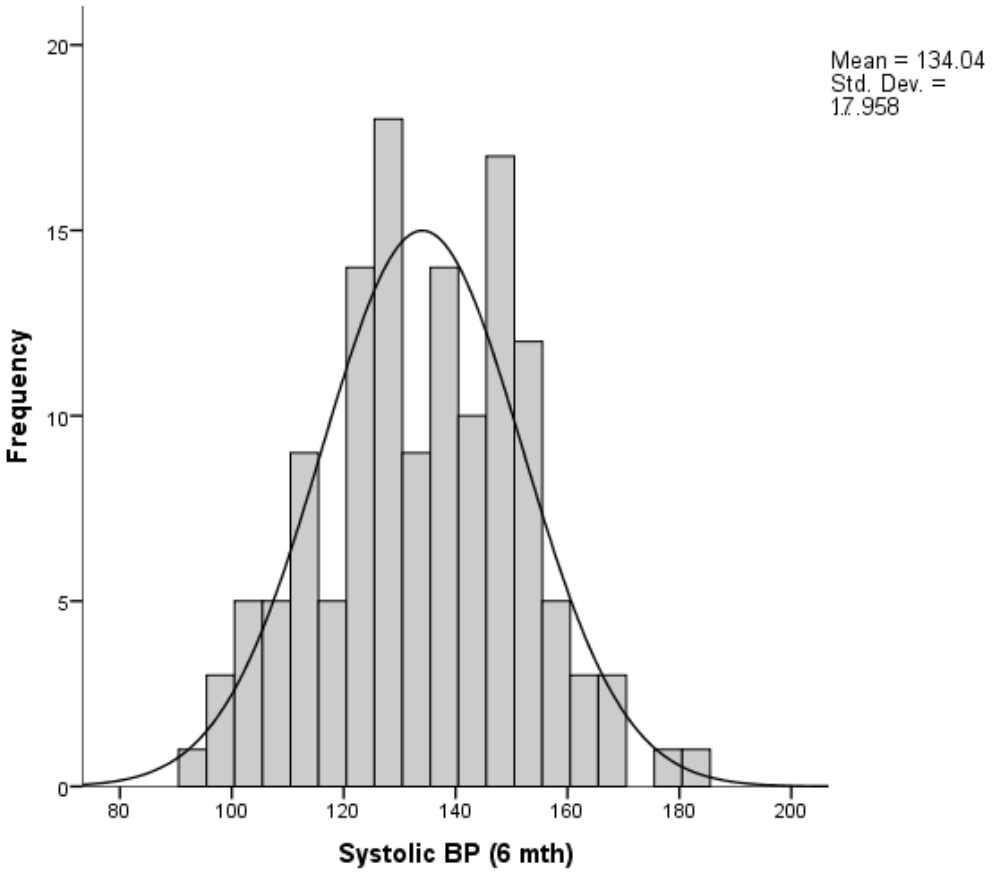
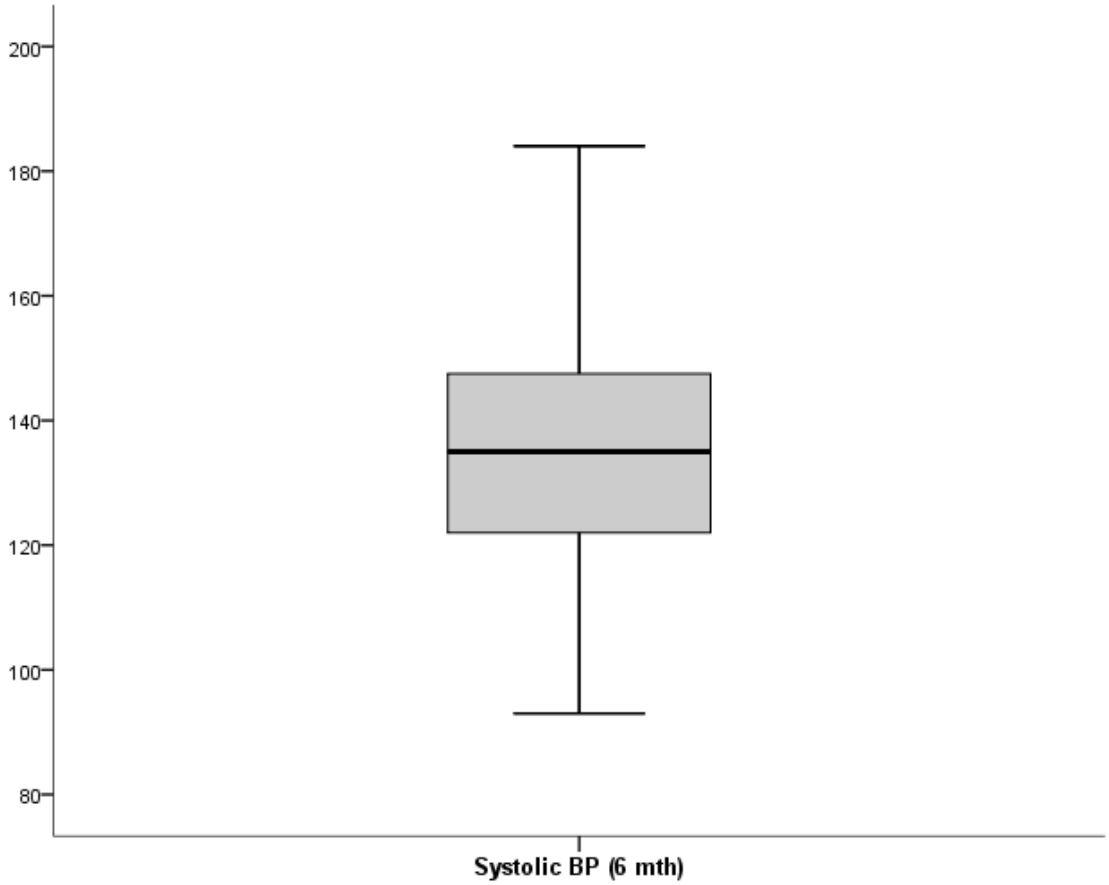
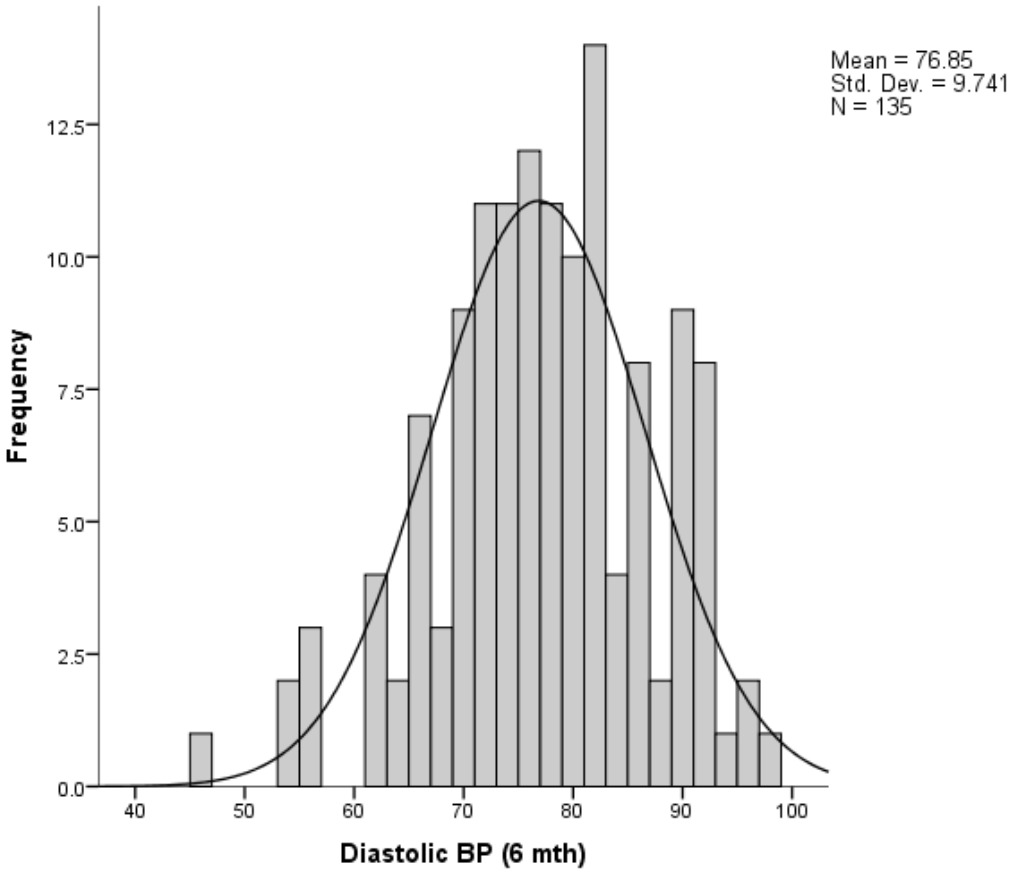

1318
592
2418
23
814
BMI6m

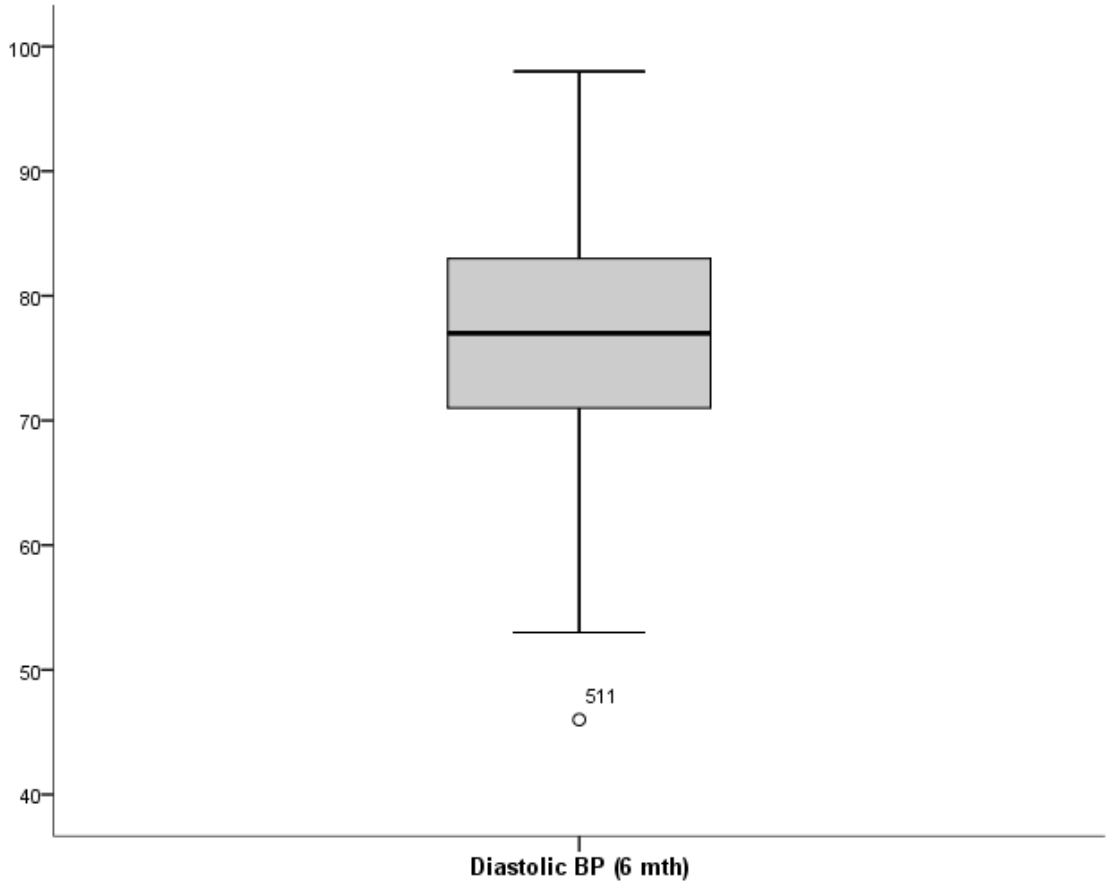
Systolic Blood Pressure



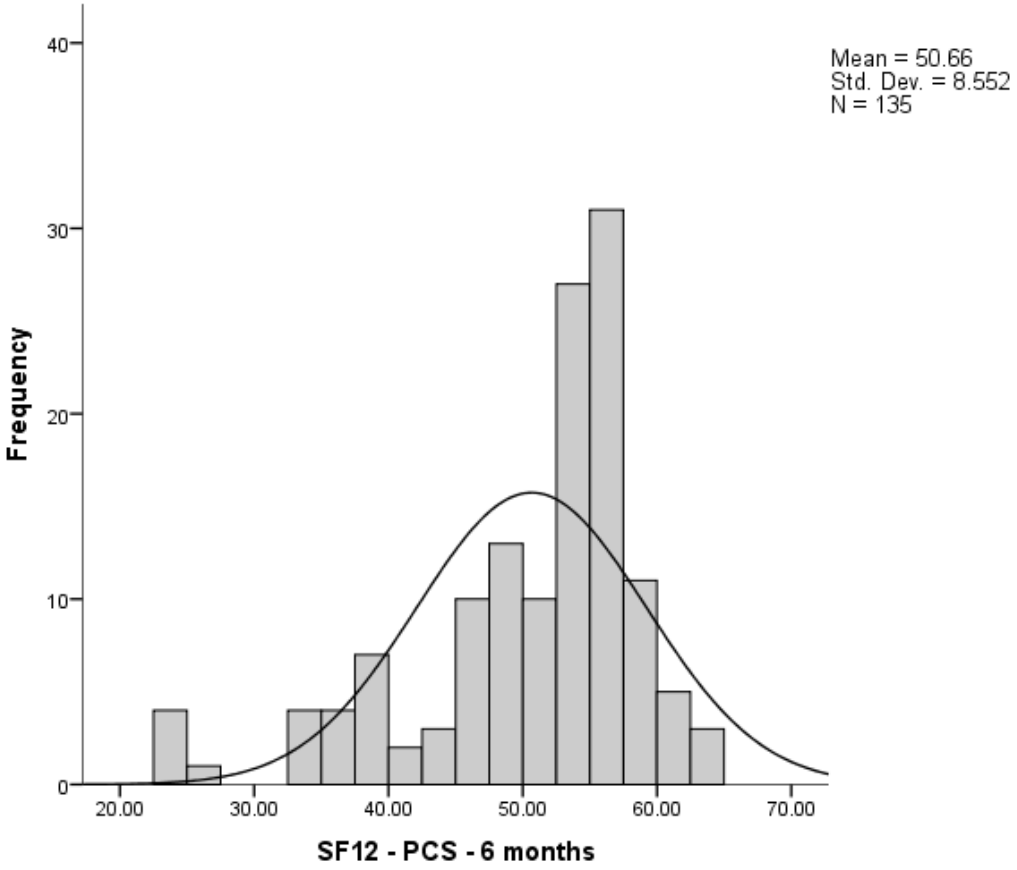


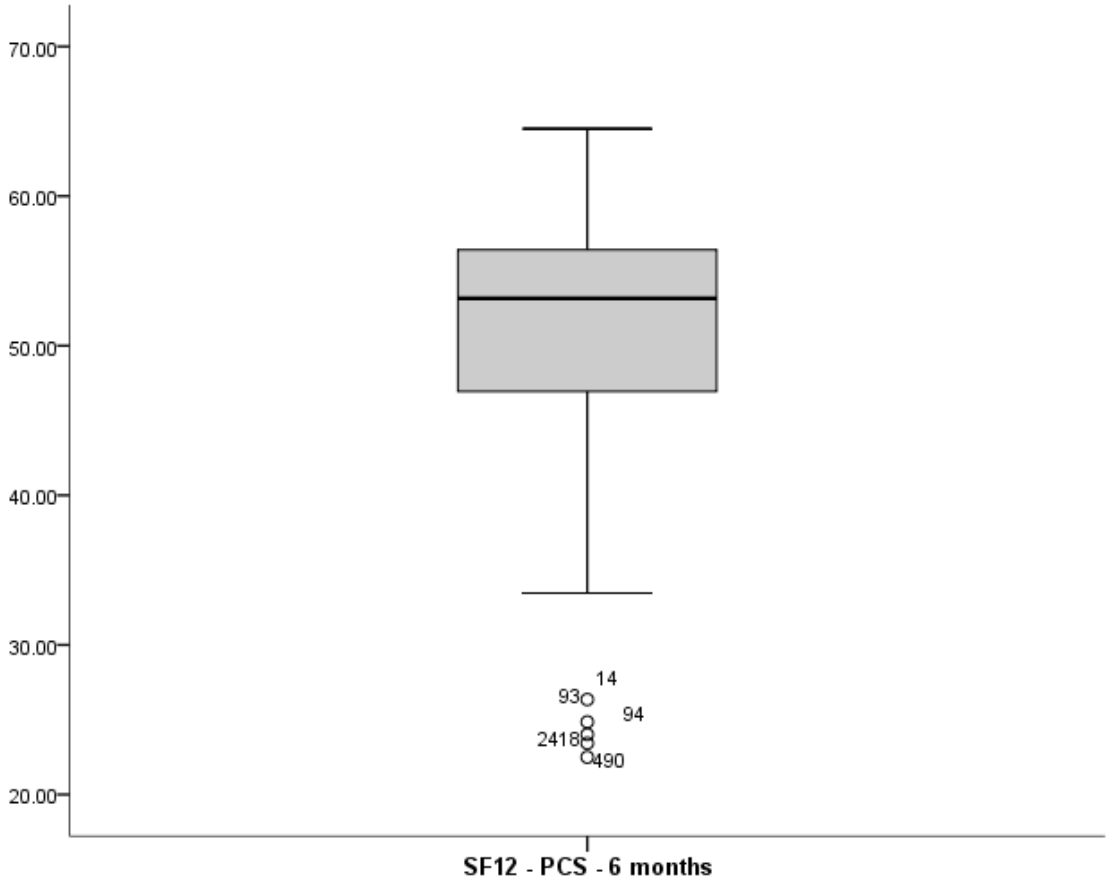
Diastolic Blood Pressure



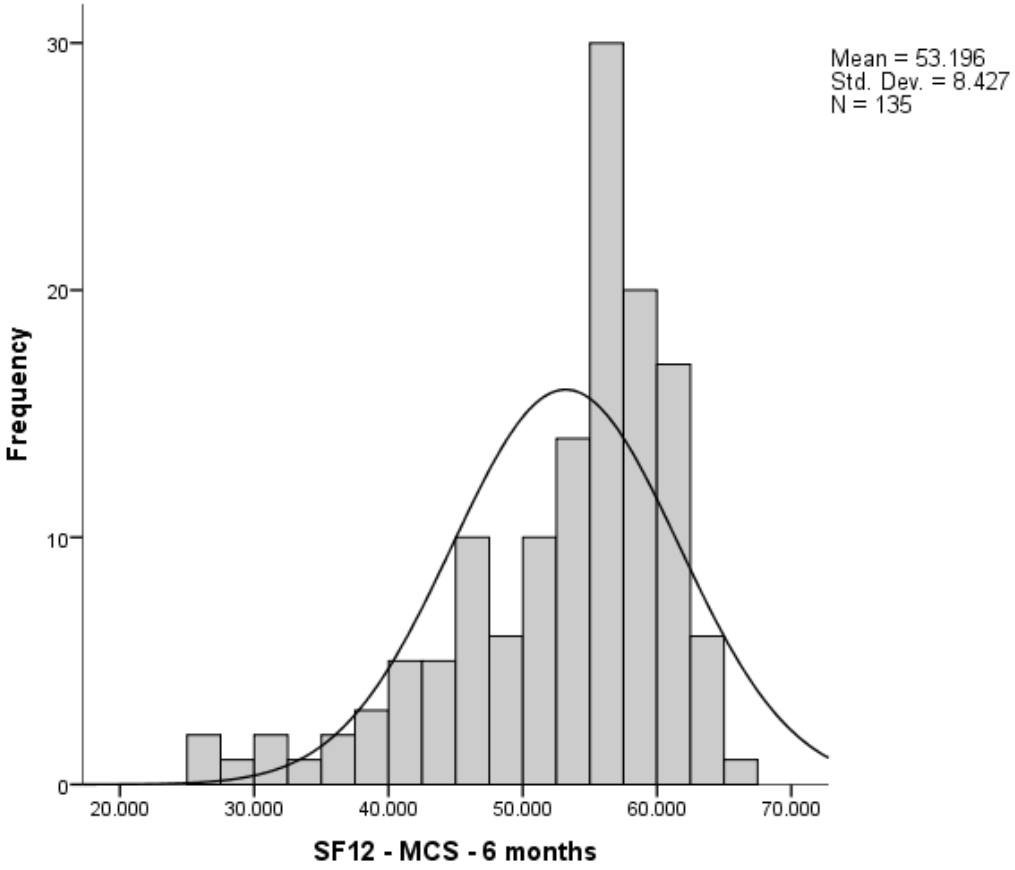


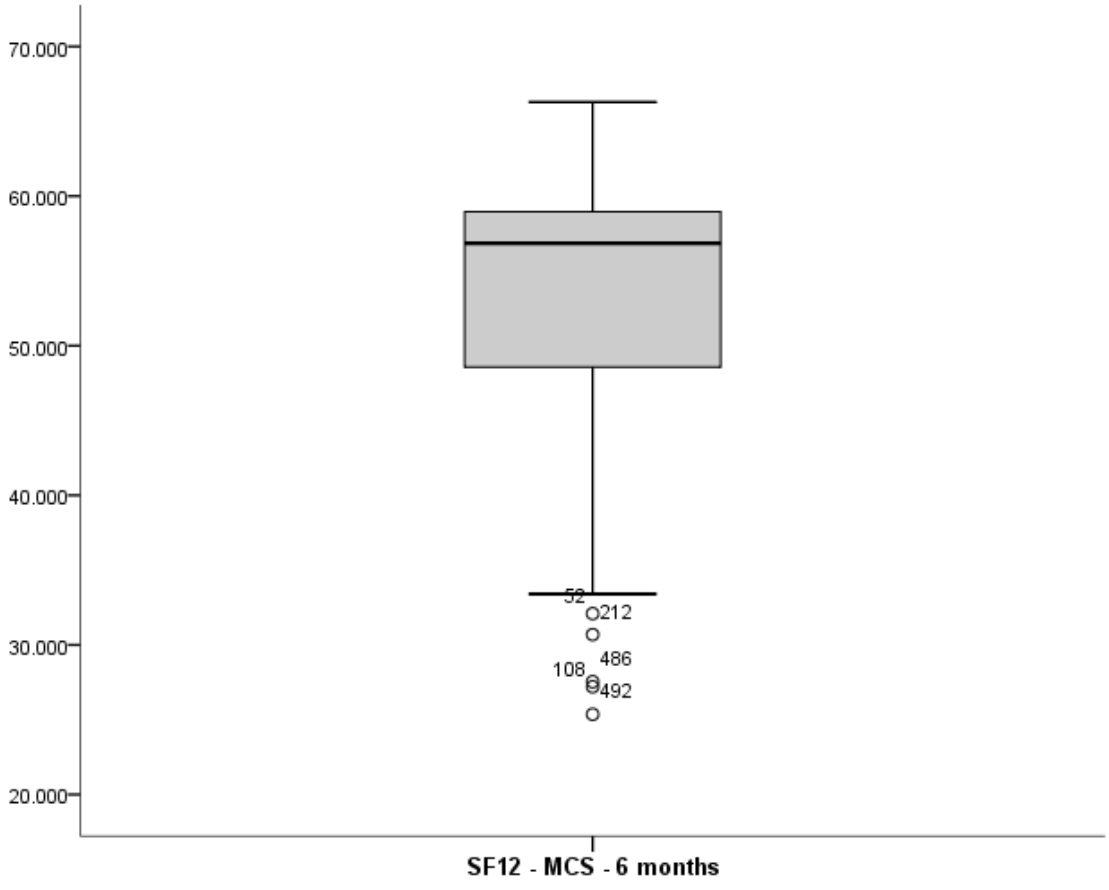
SF12v2 Health State – Physical Component Score



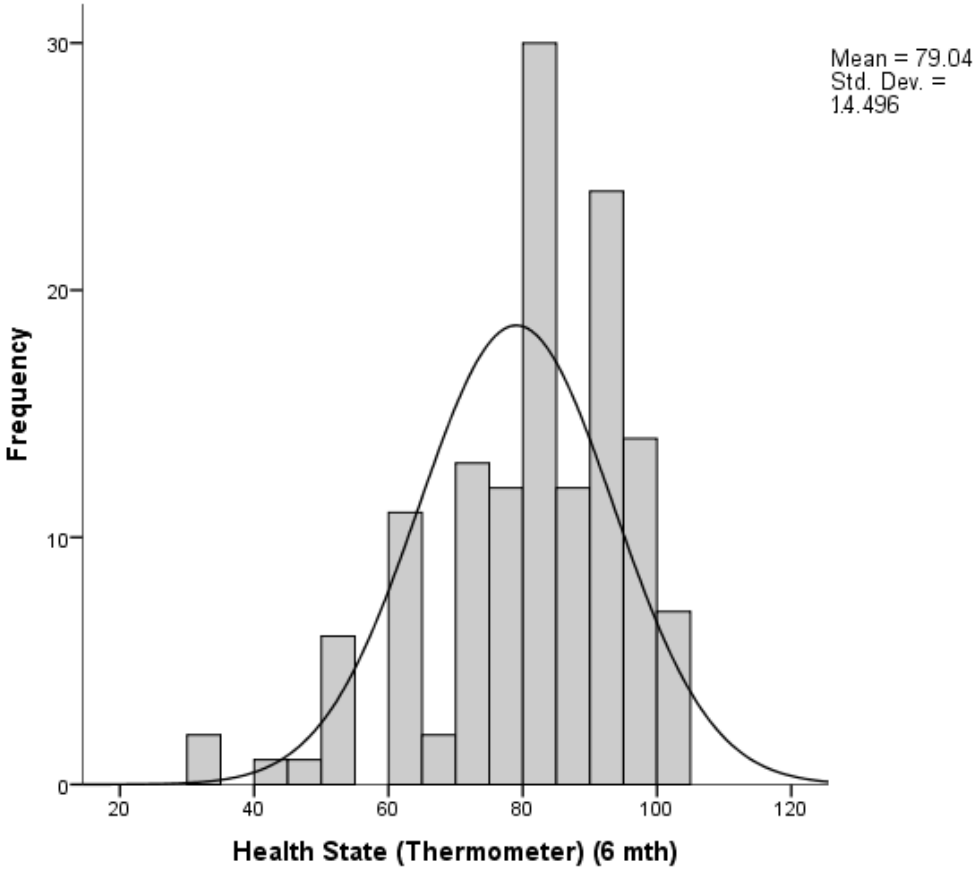


SF12v2 Health State – Mental Component Score

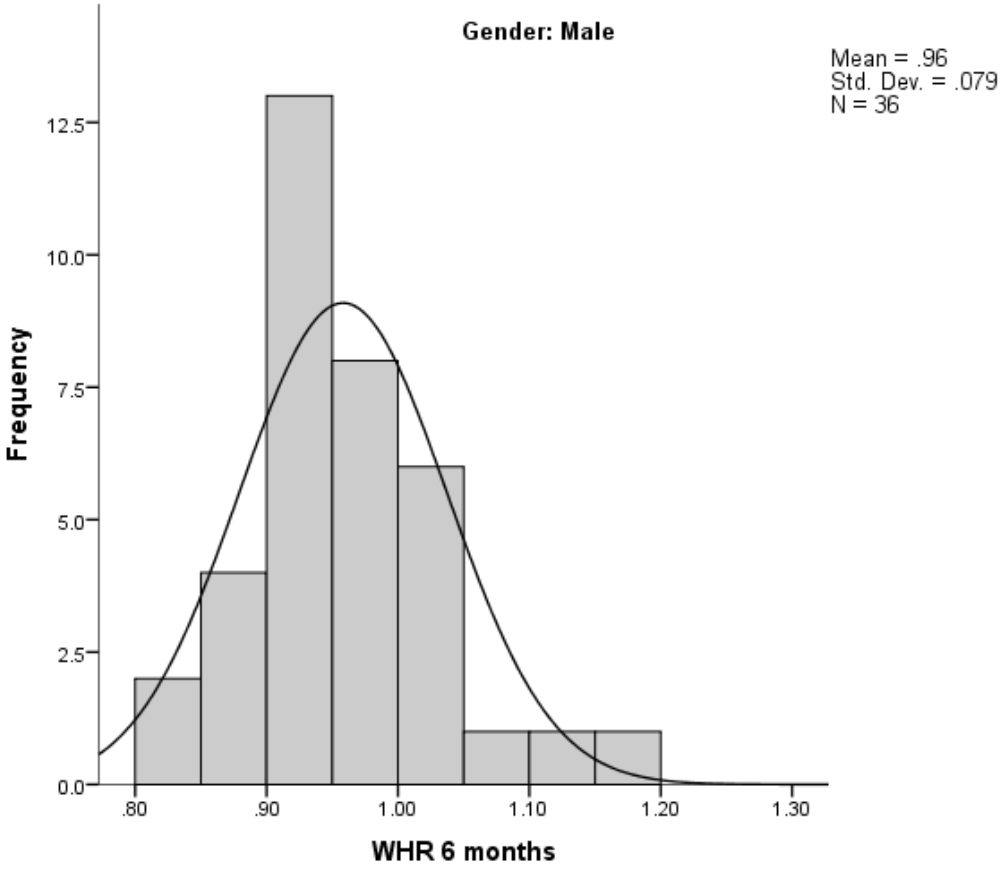


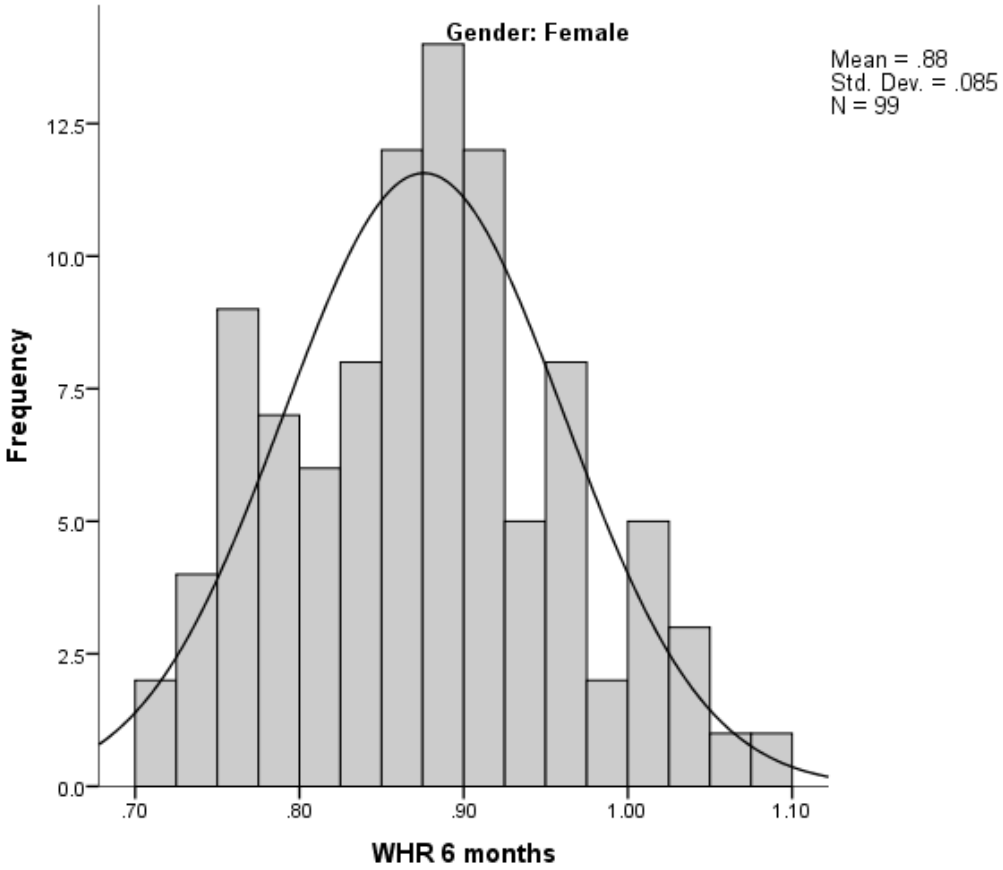


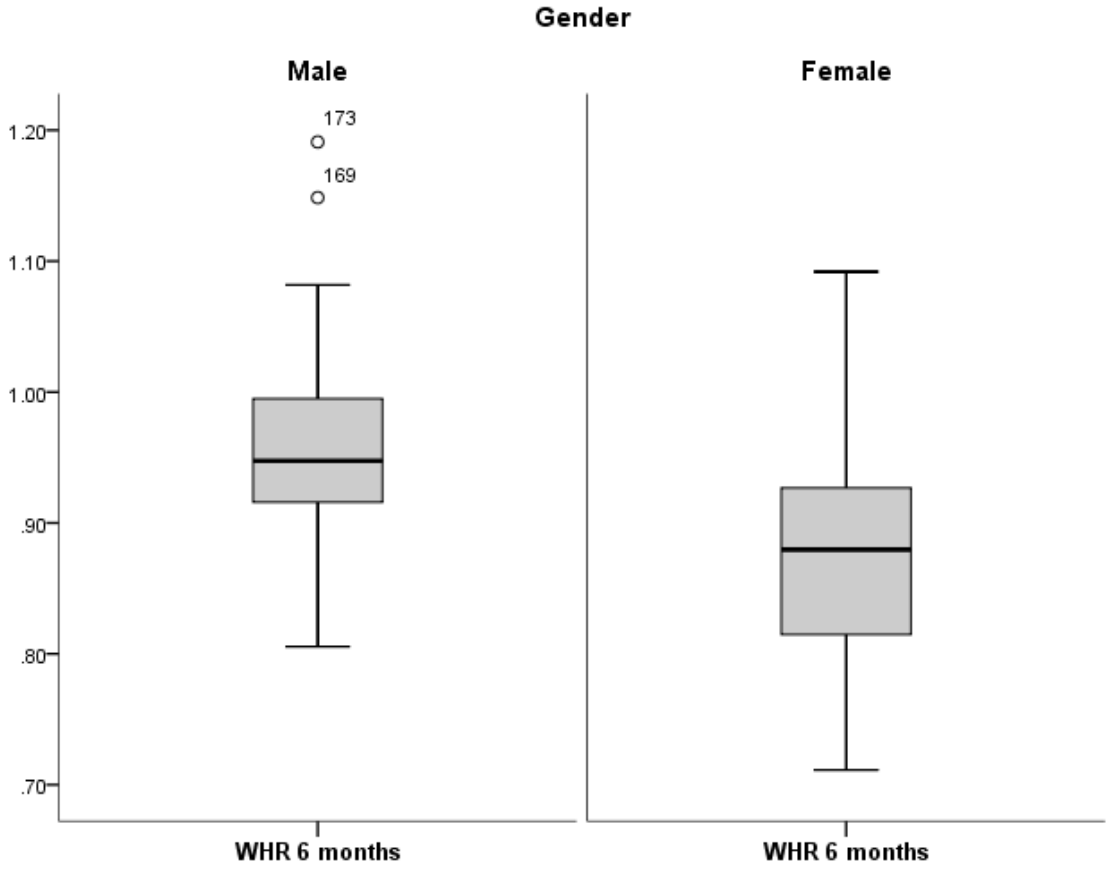
EQ-5D Health State (VAS)



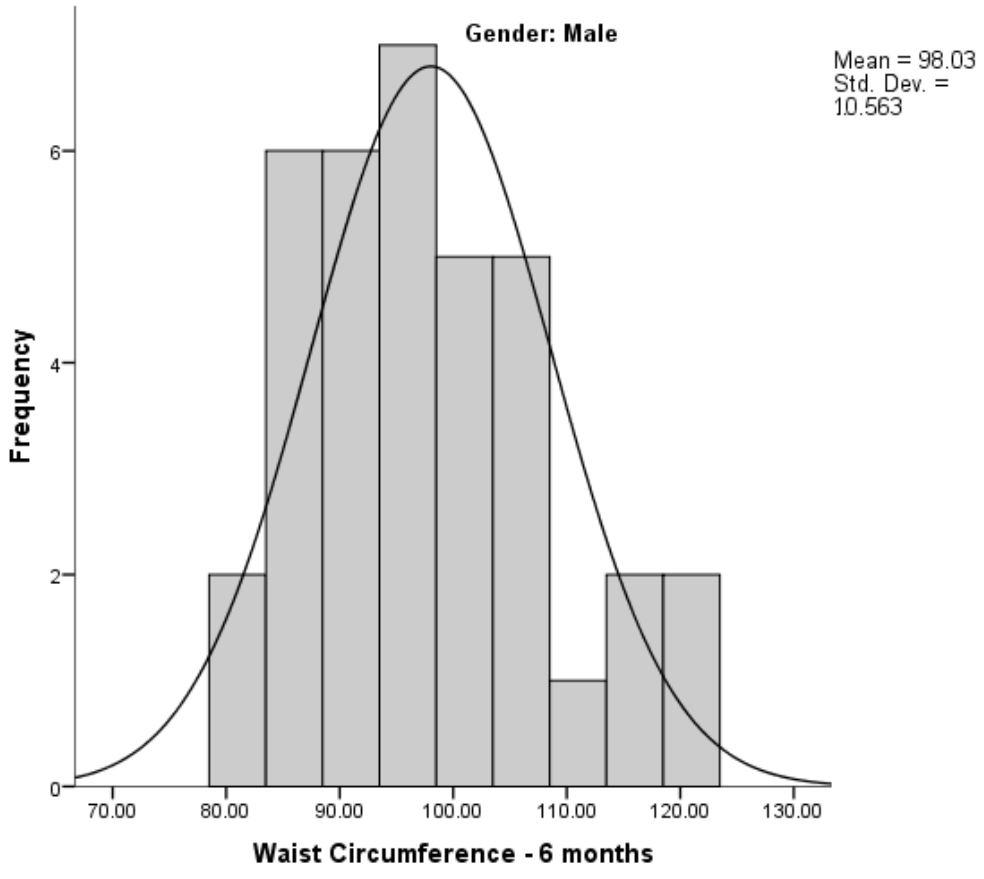
Waist-Hip Ratio (by Gender)

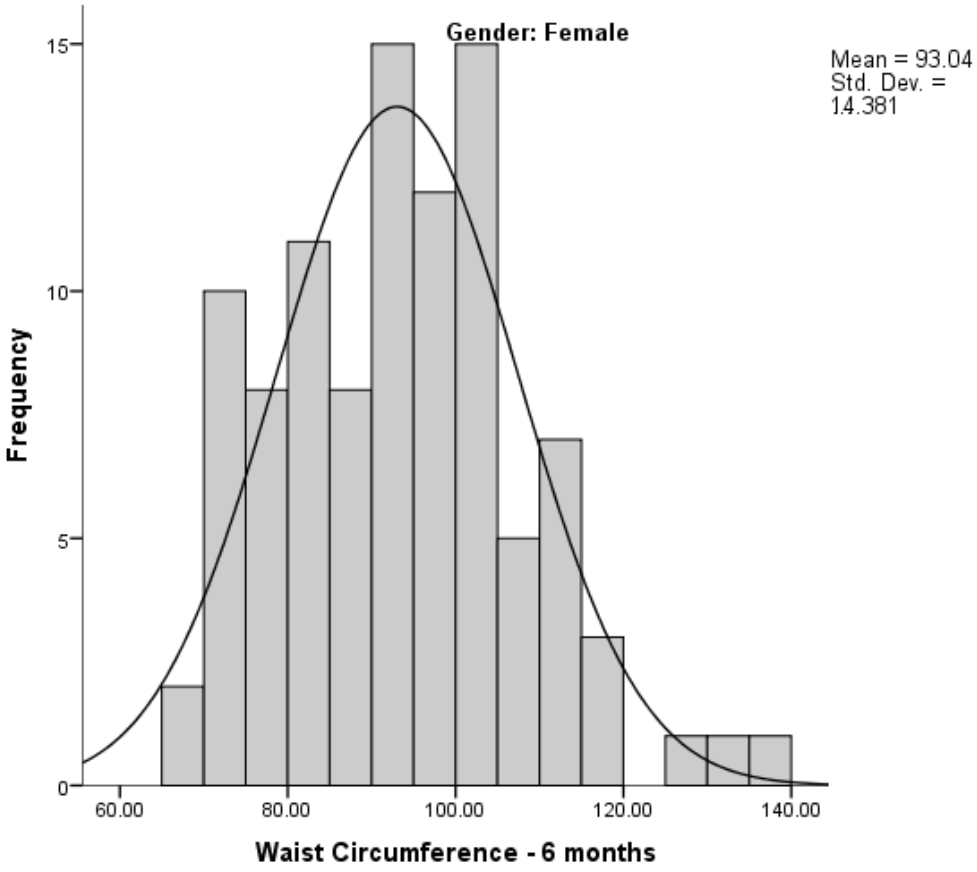


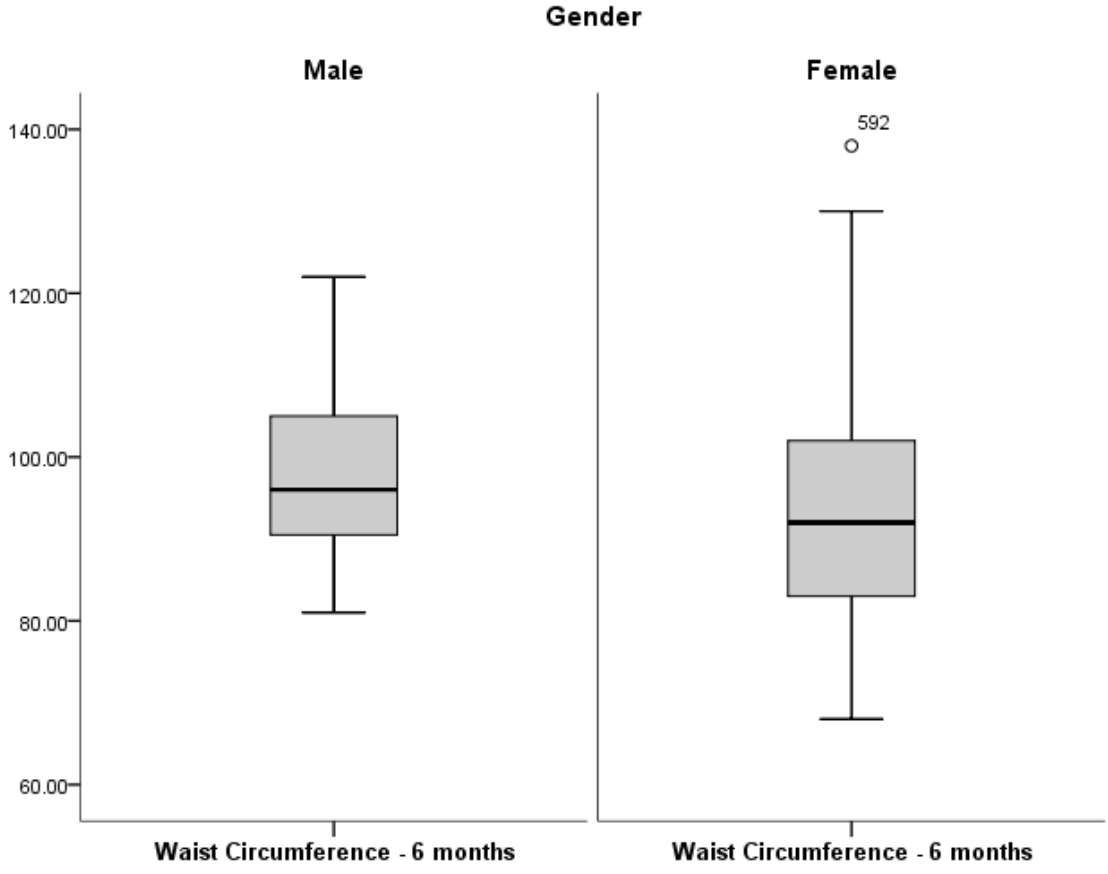




Waist Circumference (by Gender)




Gender: Female
Mean = 93.04
Std. Dev. =
14.381
Frequency
15
10
5
0
60.00
80.00
100.00
120.00
140.00
Waist Circumference - 6 months


Gender
Male
Female
592
140.00
120.00
100.00
80.00
60.00
Waist Circumference - 6 months
Waist Circumference - 6 months

Testing for Robustness against Outliers

To determine whether univariate outliers were present, standardised z-scores were produced, identifying extreme (>3.29 standard deviations (SD) away from the mean), probable (>2.58 SDs away from the mean) and potential (>1.96 SD away from the mean) outliers. Values that were identified as extreme were considered univariate outliers. Data values greater than 3.29 standard deviations away from the mean were substituted with a score 3.29 standard deviations away from the mean for each variable. Table 46 presents, for each variable, values ± 3.29 standard deviations away from the mean. This figure was then used to substitute any value greater than this. The numbers of cases affected are also presented. To assess their impact, data analyses were conducted with and without the inclusion of such outliers and results compared. The presence of outliers was deemed to affect the outcome of a parametric test when a change in statistical significance and / or a marked change in effect size was found. No affect was found for any parametric variable which indicated the results were robust against the presence of potential outliers. Therefore, results are presented from data analysis with all values included.

Table 46. *Dependent variables with remaining extreme values as identified through z-scores of amended data*

Variable	Mean	Standard Deviation	Extreme Outliers (>3.29) N (%)	Value of Z-score	
				- 3.29 SD	+ 3.29 SD
Baseline					
BMI	28.69	5.35	14 (0.8)	11.09	46.29
SBP	134.08	18.64	7 (0.4)	72.75	195.41
DBP	79.82	11.42	7 (0.4)	42.25	117.39
SF12-MCS	49.48	9.77	6 (0.4)	17.34	81.62
SF12-PCS	48.85	8.96	10 (0.7)	19.37	78.33
WC-Male	98.78	13.00	1 (0.2)	56.01	141.55
WC-Female	93.45	14.46	4 (0.3)	45.88	141.02
Three-Months					
BMI	28.36	5.03	8 (0.7)	11.81	44.91
SBP	134.25	17.78	2 (0.2)	75.75	192.75

DBP	78.67	10.93	3 (0.3)	42.71	114.63
SF12-MCS	52.66	8.26	6 (0.9)	25.48	79.84
SF12-PCS	49.95	8.43	7 (0.7)	22.22	77.68
EQ-5D (VAS)	80.01	14.90	12 (1.1)	30.99	129.03
WC-Male	97.37	11.70	1 (0.4)	58.88	135.86
WC-Female	90.70	13.72	3 (0.4)	45.56	135.84
Six-Months					
BMI	28.01	5.15	2 (1.5)	11.07	44.95
SF12-MCS	53.19	8.46	1 (0.7)	25.36	81.02
SF12-PCS	50.66	8.56	1 (0.7)	22.50	78.82
EQ-5D (VAS)	79.02	14.59	2 (1.5)	31.02	127.02

Note. SBP = Systolic Blood Pressure, DSP = Diastolic Blood Pressure, WHR = Waist-Hip Ratio, WC = Waist Circumference, TPB = Theory of Planned Behaviour.

Appendix 11: Pilot Focus Group Information

Pilot focus groups were conducted with two groups:

Group 1: Health Walkers (n = 7)
Location: RSPB Centre, Great Barr.

Group 2: Bangladeshi Ladies (n = 6)
Location: Brasshouse Lane Community Centre, Smethwick.

Focus Group Schedule

Table 47. *General schedule for pilot focus groups 1 and 2 consisting of question, possible prompts and psychological constructs*

Question and Possible Prompts	**Psychological Constructs (Process of Change – TTM)**
1. What to you is good health? / What to you is a healthy lifestyle?	
Diet? Mental / Emotional Health? Physical Activity? Low stress levels? Not smoking?	*Consciousness Raising?*
2. Think back to the last time you wanted to make a change relating to your health. It may have been a change in what you eat, your weight, smoking or exercise habits. What kind of barriers of road blocks did you run into?	
Time? Self efficacy? Access? Confidence? Lack of information?	
3. What helped you or what would have helped you the most in making the change?	
Social Support? Easy access? Fits into lifestyle?	*Helping relationships?*
4. Suppose you have been told by your doctor that you need to increase your physical activity levels. What would you want to know, or what kind of information would you like to get?	
How much PA? Benefits? Support from public services? – facilities, programmes, groups.	*Consciousness raising?* *Environmental re-evaluation?*
5. There are lots of different ways you could get the types of information you have just been talking about. How would you like to get that information?	
Written? Verbal? – Through consultation etc	*Consciousness raising?* *Decisional Balance?*
6. We realise that it is hard to get motivated to take up physical activity and may be even harder to stay motivated and to carry on being physically active. What do you think could help you to start being physically active?	
Motivation strategies?	*Helping relationships?*

	Counter conditioning? *Decisional Balance?*
7. How motivated do you feel at this moment to increase your physical activity levels?	
Stage of change, precontemplation, contemplation, preparation, action, maintenance?	
8. What things do you think are most important in encouraging you to take up physical activity?	
	Helping relationships?
9. Do you think that receiving some kind of incentive would have an effect on your decision to take up physical activity?	
Walk to Beijing? Reasons for signing up? Reinforcement?	*Reinforcement management?*
10. Why do you think that some people start and then stop being physically active?	
Relapse?	*Helping relationships?*
11. What do you think would motivate a person to keep on being physically active?	
	Self liberation? *Stimulus Control?*
12. Do you have any advice that would help someone to make a change relating to their health and for them to keep it up?	
13. What do you think are the best ways that public services can help you change your behaviour for the better?	
Relating to programmes e.g. WTB, Facilities and changing the obesogenic environment,	
14. Do you think these things would be a good way to spend public money?	
If yes, why? If no, how would they spend public money to help people get active?	

Appendix 12: Semi-structured Interview Guide (Three- and Six-month)

INTRODUCTION

- Gemma Hurst; Staffordshire University.
- Like last time, I just need you to read the information sheet (the same as you received during the post) and if you are happy sign the consent form.
- This interview will be conducted in the same way as your previous interviews. So again, I will be recording the interview. If you have any questions then feel free to ask.
- I have a few questions written down to use as a guide but feel free to bring up anything you wish and also ask me any questions if you'd like and remember there are no right or wrong answers. You won't be judged on what you say as this research focuses on your experiences.
- As it says on the information sheet, I will be audio recording this interview, however, you will not be able to be identified from the recording and your information will be kept confidential.

QUESTIONS (and potential prompts)

- Firstly, I'd like to ask how you became involved in the Walk to Beijing project?
    - *Friends, family, advertisements, word of mouth?*
- What attracted you to the Walk to Beijing project?
    - *Health reasons, financial incentive, pedometer, to change behaviour?*
- You have just completed your second health assessment, can you think back to your first health assessment and tell me a little about it?
    - *Information/advice received, measures taken, health assessor*
- If participants mention advice/information: what did you think about this information/advice?
    - *Good, bad, indifferent. What information would they like to receive?*
- Did you act on any of the information or advice that you received?
    - *If yes, what kind of things do you do now that you didn't do before? Change in behaviour, physical activity etc.*

- Have you noticed any affects of taking part in the project?
    - *Benefits? No change?*
- What was the most important thing about the project that encouraged you to take part?
    - *Support, monitoring, incentive, pedometer, health assessment?*
- Can I ask what reward you received from the project?
- How did you feel about receiving this award?
    - *Happy with it?*
- If you could choose, what kind of reward would you like to receive?
- If you didn't receive a reward as part of this project, how do you think it would have affected your decision to take part?
    - *Would the project still encourage people to participate in walking as a lifestyle activity?*
    - *How important is the reward?*
- Do you think taking part in the Walk to Beijing project had an impact on your lifestyle?
    - *If yes, in what ways? (Increase in physical activity?)*
- Have you gained anything from taking part in the project?
- Are there any barriers to changing your lifestyle and increasing your physical activity levels?
    - *Time, access, lack of support, responsibilities etc.*
- If yes, have you overcome these barriers?
    - If yes, how?
- Had you taken part in physical activity before joining the Walk to Beijing project?
    - If yes, what were they?
- It is often hard to keep motivated and carry on being physically active. Since you completed the project (three- or six-months) what has your motivation been like?
- How motivated are you to be physically active in the future? How confident are you that you can achieve this?
- Why do you think some people might not be able to stay motivated?
- What aspects of the project, if any, helped your motivation?
    - *Incentive, pedometer, support etc.*
- Would you encourage others to take part in the project?
    - *If yes, why?*

    - *If no, why?*
- Is there anything you would change about the project?
    - *Changes, improvements, add things, take things away etc.*
- Do you think this type of project is a good or bad way to spend public money?
- Do you have anything else you would like to add?

[Remind participants that they will have the opportunity to see the written transcript of this interview]

CLOSE

- Thank you for coming today, it is very much appreciated,
- Have you got any questions for me before we finish?

Thank you.

Appendix 13a: Letter of Invitation: Semi-structured Interview (Three-month)

Sandwell Metropolitan Borough Council

Sandwell NHS Primary Care Trust

Joint Health and Social Care Policy Unit
Kingston House
438 High Street
West Bromwich
B70 9LD
Telephone: 0845 155 0500
Facsimile: 0121 612 1410

Date ********

Dear **********

RE: Walk to Beijing Second Health Assessment

Thank you for attending your first health assessment. Please find below details of your re-assessment.

DATE:
TIME:
VENUE:

At your re-assessment we will be able to see if there have been any changes in the health measures that we took three months ago. You will then be rewarded with up to £40.00 of gift vouchers depending on the level of improvement you have made AND even if there has been no change you will still be rewarded for attending your second health assessment.

Please note – you will not receive your vouchers on the day of your re-assessment. They will be posted to you via recorded delivery approximately two weeks after your assessment.

PLEASE REMEMBER TO BRING YOUR STEP COUNTER LOG BOOK WITH YOU EVEN IF IT'S NOT COMPLETE.

You have also been chosen at random to take part in an optional additional 30 minute interview with Gemma Hurst, a research student form Staffordshire University. This 30 minute interview will take place immediately after your health assessment and will result in your assessment being 1 hour in total. As a thank you for taking part in this 30 minute interview you will receive a £10.00 Sainsbury's voucher in addition to the vouchers you achieve as your reward through the programme. For further information on this 30 minute interview please see the attached Information Sheet from Staffordshire University.

If you do not wish to take part in the additional 30 minute interview please telephone me on 0121 612 1651 and we will re-arrange the assessment for you.

Many Thanks

L.Manford
Lindsay Manford
Walk to Beijing Co-ordinator

Appendix 13b: Letter of Invitation: Semi-structured Interview (Six-month)

Sandwell Metropolitan Borough Council

Sandwell NHS Primary Care Trust

Joint Health and Social Care Policy Unit
Kingston House
438 High Street
West Bromwich
B70 9LD
Telephone: 0845 155 0500
Facsimile: 0121 612 1410

Date ********

Dear ********** ,

RE: Walk to Beijing Additional Health Assessment

Thank you for attending your 2nd assessment and we hope that you received your vouchers safely through the post.

We would now like to offer you the opportunity to return for an additional health check to see if you have made any further health improvements. This 3rd assessment should be approximately 3 months after your 2nd assessment.

On this occasion you **will not** be rewarded for attending the additional assessment but it will be an ideal opportunity for you to see if you have continued to make improvements in the areas of health that we measure.

In addition to the health assessment we will also be holding optional additional 30 minute interviews with Gemma Hurst, a research student form Staffordshire University. This 30 minute interview will take place immediately after your health assessment and will result in your assessment being 1 hour in total. As a thank you for taking part in this 30 minute interview you will receive a £10.00 Sainsbury's voucher. For further information on this 30 minute interview please see the attached Information Sheet from Staffordshire University.

If you would like to receive an additional health assessment/ 30 minute interview please complete and return the enclosed form in the pre paid envelop and we will contact you to book an appointment.

Many Thanks

L.Manford

Lindsay Manford
Walk to Beijing Co-ordinator
0121 612 1651

WALK TO BEIJING
6 Month Assessments/Interviews

PLEASE COMPLETE IN BLOCK CAPITALS

NAME_____

ADDRESS_____

_____

_____

POST CODE_____

CONTACT NUMBER_____

I WOULD LIKE TO RECEIVE;

	Please Tick
A 6 month assessment	
A 6 month assessment and 30 minute interview	

Please return in the enclosed pre-paid envelope or post to;

Walk to Beijing
Sandwell PCT
Kingston House
438 High Street
West Bromwich
B70 9LD

Appendix 13c: Letter of Invitation: Semi-structured Interview (12-month)

Sandwell Metropolitan Borough Council

Sandwell NHS Primary Care Trust

Joint Health and Social Care Policy Unit
Kingston House
438 High Street
West Bromwich
B70 9LD
Telephone: 0845 155 0500
Facsimile: 0121 612 1410

Date ********

Dear ********** ,

RE: Walk to Beijing Additional Health Assessment

Thank you for attending your 3rd assessment. We would now like to offer you the opportunity to return for an additional health check to see if you have made any further health improvements. This 4th assessment should be approximately 3 months after your 3rd assessment.

On this occasion you **will not** be rewarded for attending the additional assessment but it will be an ideal opportunity for you to see if you have continued to make improvements in the areas of health that we measure.

In addition to the health assessment we will also be holding optional additional 30-40 minute interviews with Gemma Hurst, a research student form Staffordshire University. This 30-40 minute interview will take place immediately after your health assessment and will result in your assessment being a maximum of 1 hour 10 minutes in total. As a thank you for taking part in this 30 minute interview you will receive a £10.00 Sainsbury's voucher. For further information on this 30 minute interview please see the attached Information Sheet from Staffordshire University.

If you would like to receive an additional health assessment/ 30 minute interview please complete and return the enclosed form in the pre paid envelop and we will contact you to book an appointment.

Many Thanks

L.Manford

Lindsay Manford
Walk to Beijing Co-ordinator
0121 612 1651

WALK TO BEIJING
12 Month Assessments/Interviews

PLEASE COMPLETE IN BLOCK CAPITALS

NAME_____

ADDRESS_____

_____

_____

POST CODE_____

CONTACT NUMBER_____

I WOULD LIKE TO RECEIVE;

	Please Tick
A 12 month assessment	
A 12 month assessment and 30-40 minute interview	

Please return in the enclosed pre-paid envelope or post to;

Walk to Beijing
Sandwell PCT
Kingston House
438 High Street
West Bromwich
B70 9LD

2

Appendix 14a: Information Sheet (Three-months)

INFORMATION SHEET

STAFFORDSHIRE UNIVERSITY

Dear Sir / Madam.

Thank you for taking the time to read this information sheet. I would like to invite you to take part in an evaluation of the 'Walk to Beijing' project that you have been involved with. I am a PhD scholar in Physical Activity and Health Promotion in the Faculty of Health at Staffordshire University. This information sheet is designed to inform you about the project because it is important to understand why the study will be done before you decide whether or not to take part. Please take time to read the following information carefully. Please take your time before coming to a decision and please feel free to ask any questions if there is anything that is unclear or if you would like more information.

What is the purpose of the study?
The purpose of this study is to evaluate the 'Walk to Beijing' Project by investigating your experiences of the project. Finding out about your experiences will help the project organisers to understand more about the different aspects of the project and to help to develop and improve the project in the future.

Why have I been chosen?
You have been chosen because you have taken part in the 'Walk to Beijing' project. A number of other individuals in Sandwell who have also taken part in the project will be asked to participate in this evaluation.

Do I have to take part?
Taking part is voluntary. It is up to you whether or not to take part. If you decide to participate then you are free to withdraw from the evaluation at any time without stating a reason. You will not be disadvantaged in any way if you decide that you do not wish to take part or wish to withdraw from the study at any time. If you decide that you do not want to continue with the evaluation any data that is collected will be destroyed.

What will I be asked to do if I decide to take part?
You will be asked to take part in an individual interview that will last up to 30 minutes. The interview will take place after your second health assessment in the same location. The interview will involve questions relating to your experiences, attitudes and opinions of the 'Walk to Beijing' project. You will be informed to answer only the questions that you want to and there are no right or wrong answers, it is only your experiences of the project that are of interest. To ensure that we have an accurate account of your experiences the interview will be audio taped, but this

should not hinder our discussions in any way. You will be offered a copy of the transcript of the interview to confirm accuracy.

Will taking part in the study be kept confidential?
All information given by the participant will be kept confidential. Only the principle researcher will have access to the names of those taking part. Consent forms and interview tapes will be kept in a locked draw by the principle researcher at Staffordshire University for the duration of the study, and up to one year after the publication of any research findings. After this time all consent forms and interview tapes will be destroyed. Any information on the interview transcripts that allows identification will be removed. Participant identity codes will be used to identify those who have taken part to ensure anonymity.

What are the benefits of taking part?
The information that arises from this study will help to evaluate the 'Walk to Beijing' project. Finding out about your experiences will help to improve the project in the future. Please be assured that any information you chose to tell us will be anonymised to prevent your identification to ensure that you feel comfortable in discussing your experiences of the project.

What will happen with the results of the study?
The results of the study will be written up into a report for the organisers of the project. If you wish you will receive a copy of this report. It is hoped that finding out about your experiences of the project will help organisers to make improvements to the project in order to try and motivate people to be more active. We also intend to publish some of the findings in professional journals to share the findings with other professionals in the area.

Who is organising the research?
Gemma Hurst from Staffordshire University is undertaking the evaluation. Staffordshire University Ethics Committee has reviewed and approved the study.

If you need further information relating to this study, please contact:
Gemma Hurst,
Faculty of Health,
Staffordshire University,
Leek Road,
Stoke-on-Trent,
Staffordshire,
ST4 2DF

Email: gemma.hurst@staffs.ac.uk
Telephone: 01782 294024

Version 1: Semi-structured interviews (3 months)

Appendix 14b: Information Sheet (Six-months)

INFORMATION SHEET

STAFFORDSHIRE UNIVERSITY

Dear Sir / Madam.

Thank you for taking the time to read this information sheet. I would like to invite you to take part in an evaluation of the 'Walk to Beijing' project that you have been involved with. I am a PhD scholar in Physical Activity and Health Promotion in the Faculty of Health at Staffordshire University. This information sheet is designed to inform you about the project because it is important to understand why the study will be done before you decide whether or not to take part. Please take time to read the following information carefully. Please take your time before coming to a decision and please feel free to ask any questions if there is anything that is unclear or if you would like more information.

What is the purpose of the study?
The purpose of this study is to evaluate the 'Walk to Beijing' Project by investigating your experiences of the project. Finding out about your experiences will help the project organisers to understand more about the different aspects of the project and to help to develop and improve the project in the future.

Why have I been chosen?
You have been chosen because you have taken part in the 'Walk to Beijing' project. A number of other individuals in Sandwell who have also taken part in the project will be asked to participate in this evaluation.

Do I have to take part?
Taking part is voluntary. It is up to you whether or not to take part. If you decide to participate then you are free to withdraw from the evaluation at any time without stating a reason. You will not be disadvantaged in any way if you decide that you do not wish to take part or wish to withdraw from the study at any time. If you decide that you do not want to continue with the evaluation any data that is collected will be destroyed.

What will I be asked to do if I decide to take part?
You will be asked to take part in an individual interview that will last up to 30 minutes. The interview will take place in a similar location to your 2nd health assessment, e.g. local community centre. The interview will involve questions relating to your experiences, attitudes and opinions of the 'Walk to Beijing' project. You will be informed to answer only the questions that you want to and there are no right or wrong answers, it is only your experiences of the project that are of interest. To ensure that we have an accurate account of your experiences the interview will be audio taped,

but this should not hinder our discussions in any way. You will be offered a copy of the transcript of the interview to confirm accuracy.

Will taking part in the study be kept confidential?
All information given by the participant will be kept confidential. Only the principle researcher will have access to the names of those taking part. Consent forms and interview tapes will be kept in a locked draw by the principle researcher at Staffordshire University for the duration of the study, and up to one year after the publication of any research findings. After this time all consent forms and interview tapes will be destroyed. Any information on the interview transcripts that allows identification will be removed. Participant identity codes will be used to identify those who have taken part to ensure anonymity.

What are the benefits of taking part?
The information that arises from this study will help to evaluate the 'Walk to Beijing' project. Finding out about your experiences will help to improve the project in the future. Please be assured that any information you chose to tell us will be anonymised to prevent your identification to ensure that you feel comfortable in discussing your experiences of the project.

What will happen with the results of the study?
The results of the study will be written up into a report for the organisers of the project. If you wish you will receive a copy of this report. It is hoped that finding out about your experiences of the project will help organisers to make improvements to the project in order to try and motivate people to be more active. We also intend to publish some of the findings in professional journals to share the findings with other professionals in the area.

Who is organising the research?
Gemma Hurst from Staffordshire University is undertaking the evaluation. Staffordshire University Ethics Committee has reviewed and approved the study.

If you need further information relating to this study, please contact:
Gemma Hurst,
Faculty of Health,
Staffordshire University,
Leek Road,
Stoke-on-Trent,
Staffordshire,
ST4 2DF

Email: gemma.hurst@staffs.ac.uk
Telephone: 01782 294024

Version 2: Semi-structured interviews (6 months)

Appendix 14c: Information Sheet (12-months)

INFORMATION SHEET

STAFFORDSHIRE UNIVERSITY

Dear Sir / Madam.

Thank you for taking the time to read this information sheet. I would like to invite you to take part in an evaluation of the 'Walk to Beijing' project that you have been involved with. I am a PhD scholar in Physical Activity and Health Promotion in the Faculty of Health at Staffordshire University. This information sheet is designed to inform you about the project because it is important to understand why the study will be done before you decide whether or not to take part. Please take time to read the following information carefully. Please take your time before coming to a decision and please feel free to ask any questions if there is anything that is unclear or if you would like more information.

What is the purpose of the study?
The purpose of this study is to evaluate the 'Walk to Beijing' Project by investigating your experiences of the project. Finding out about your experiences will help the project organisers to understand more about the different aspects of the project and to help to develop and improve the project in the future.

Why have I been chosen?
You have been chosen because you have taken part in the 'Walk to Beijing' project. A number of other individuals in Sandwell who have also taken part in the project will be asked to participate in this evaluation.

Do I have to take part?
Taking part is voluntary. It is up to you whether or not to take part. If you decide to participate then you are free to withdraw from the evaluation at any time without stating a reason. You will not be disadvantaged in any way if you decide that you do not wish to take part or wish to withdraw from the study at any time. If you decide that you do not want to continue with the evaluation any data that is collected will be destroyed.

What will I be asked to do if I decide to take part?
You will be asked to take part in an individual interview that will last up to 30-40 minutes. The interview will take place in a similar location to your previous health assessments, e.g. local community centre. The interview will involve questions relating to your experiences, attitudes and opinions of the 'Walk to Beijing' project. You will be informed to answer only the questions that you want to and there are no right or wrong answers, it is only your experiences of the project that are of interest. To ensure that we have an accurate account of your experiences the interview will be

but this should not hinder our discussions in any way. You will be offered a copy of the transcript of the interview to confirm accuracy.

Will taking part in the study be kept confidential?
All information given by the participant will be kept confidential. Only the principle researcher will have access to the names of those taking part. Consent forms and interview tapes will be kept in a locked draw by the principle researcher at Staffordshire University for the duration of the study, and up to one year after the publication of any research findings. After this time all consent forms and interview tapes will be destroyed. Any information on the interview transcripts that allows identification will be removed. Participant identity codes will be used to identify those who have taken part to ensure anonymity.

What are the benefits of taking part?
The information that arises from this study will help to evaluate the 'Walk to Beijing' project. Finding out about your experiences will help to improve the project in the future. Please be assured that any information you chose to tell us will be anonymised to prevent your identification to ensure that you feel comfortable in discussing your experiences of the project.

What will happen with the results of the study?
The results of the study will be written up into a report for the organisers of the project. If you wish you will receive a copy of this report. It is hoped that finding out about your experiences of the project will help organisers to make improvements to the project in order to try and motivate people to be more active. We also intend to publish some of the findings in professional journals to share the findings with other professionals in the area.

Who is organising the research?
Gemma Hurst from Staffordshire University is undertaking the evaluation. Staffordshire University Ethics Committee has reviewed and approved the study.

If you need further information relating to this study, please contact:
Gemma Hurst,
Faculty of Health,
Staffordshire University,
Leek Road,
Stoke-on-Trent,
Staffordshire,
ST4 2DF

Email: gemma.hurst@staffs.ac.uk
Telephone: 01782 294024

Version 3: Semi-structured interviews (12 months)

Appendix 15: Consent Form

CONSENT FORM

STAFFORDSHIRE UNIVERSITY

Title of Project:

The effectiveness of an incentive scheme to promote physical activity and positive health behaviour.

Name of Researcher: Gemma Hurst

Please Initial Box

1. I confirm that I have read and understood the information sheet for the above study and have had the opportunity to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my legal rights being affected. ☐

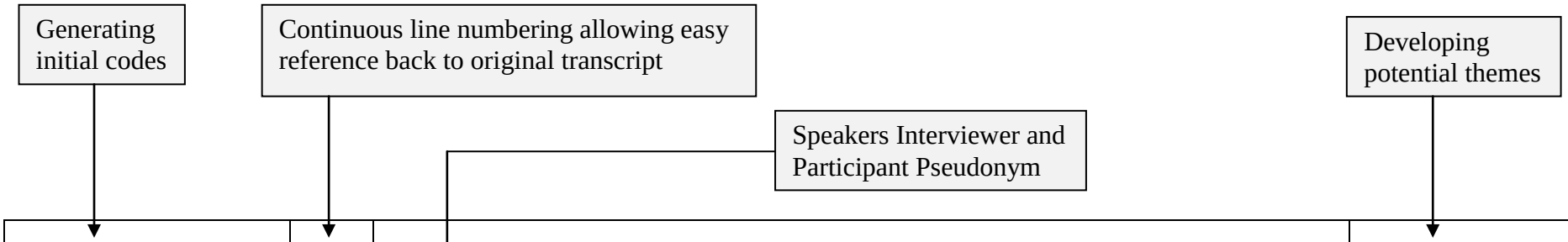
3. I understand that the interview will be audio taped for the purposes of an accurate account of my experiences and for data analysis purposes. ☐

4. I agree to take part in the above study. ☐

_____	_____	_____
Name of participant	Date	Signature
_____	_____	_____
Gemma Hurst, Researcher	Date	Signature

1 for participant; 1 for researcher

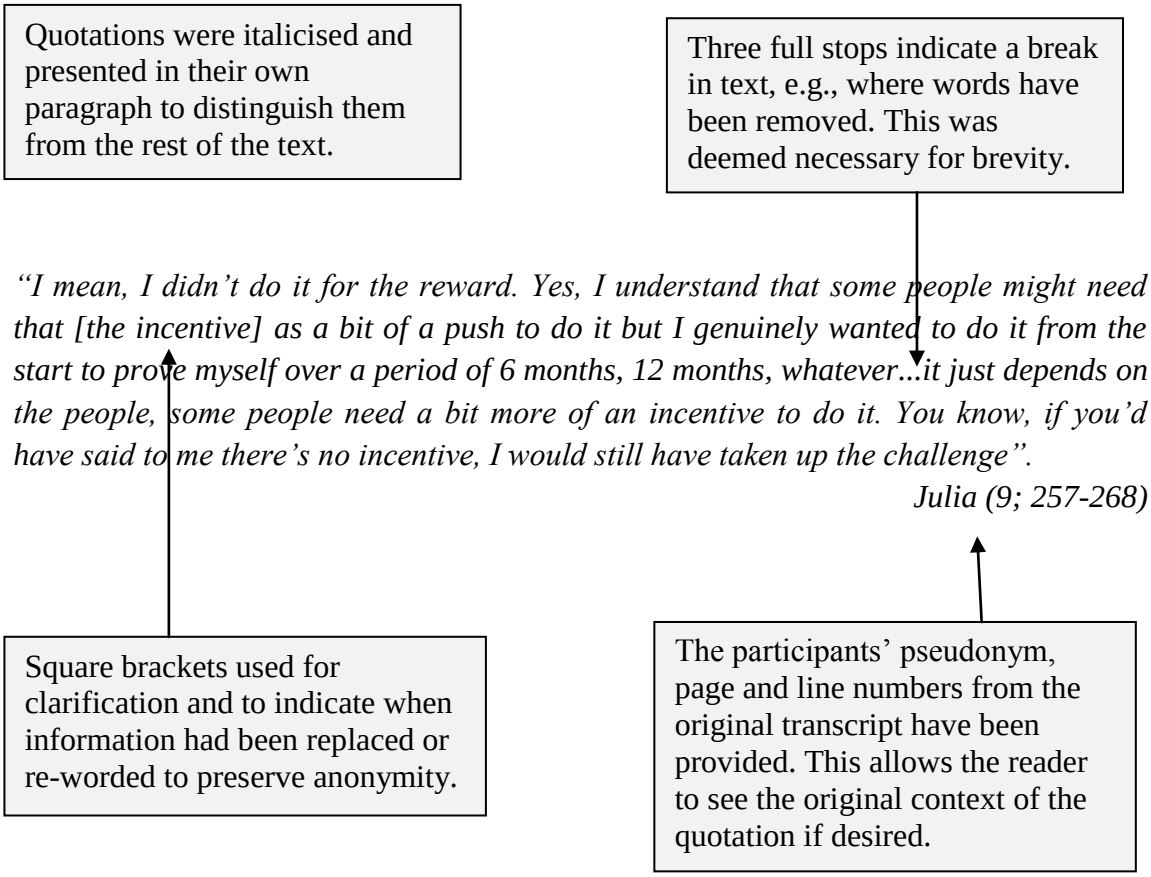
Appendix 16: Example Annotated Interview Transcript and Transcription Conventions



Notation / Coding	Line	Transcript of 3.2 – Des (Pseudonym)	Possible Themes
	10	Interviewer	
	11	How did you hear about the program, how did you become involved?	
	12		
	13	Des	
	14	Well I work for the health authority, well Sandwell PCT. So I just heard about it	
	15	through, you know, the office.	
	16		
	17	Interviewer	
	18	Could I ask you what your main motivation was for taking part?	
	19		
	20	Des	
Motivation = health	21	Well, I think it's, err, to lose weight and be active and healthy.	INITIAL MOTIVATION
	22		
	23	Interviewer	
	24	What part of the project was the thing that most attracted you to the program?	
	25		
	26	Des	
Knowledge /	27	Well I did want to find out things like my blood pressure and things like that,	INITIAL

Information relating to own health	28 29 30 31 32 33 34 35	which it did bring up, because my blood pressure was quite high. After the check [health assessment] I went to the doctors and he monitored me for a few months, well I say months, it was probably more like a few weeks. Interviewer ...and was everything fine? Des	MOTIVATION GAINS = KNOWLEDGE / AWARENESS
Health status = shock	36 37 38 39 40 41 42 43	Yes, everything was fine yeah. The thing was, when I came here on the day to be assessed I felt better than I had for ages, so it was a bit of a shock to find out that my blood pressure was a quite high. Interviewer A lot of people don't know what their blood pressure is. Des	HEALTH AWARENESS
	44 45 46 47 48 49 50 51 52	No, no, well going from that the doctor sent me for a cholesterol test and all blood tests, so its came back fine so it was a good thing to have the check up, yeah. Interviewer Yeah, it's good to find out about your own health state, and find out that everything is ok or find out about things you could change to make your health better.	GAINS = KNOWLEDGE (from further tests)
Initial shock at own health state (health not as good s believed) *Relief = health status*	53 54 55 56 57	Des Well, according to my blood pressure, it was really very high and it frightened me a bit because I'd felt so well, that it you know, and when I went it wasn't so high as it was here but it did need attention. But as I say, following on from the blood tests other things were proved to be ok, so it puts your mind at ease.	HEALTH STATUS (surprise / relief)

Appendix 17: Annotated Quotation



Appendix 18: Example Theme Development Table (Chapter 5)

	Transcript Code			Themes present in transcript (Pg #, Line #)								
Theme	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	3.11	3.12
INITIAL MOTIVATION												
Health	1, 27-18	1, 21 5, 147	1, 27	1, 19	2, 32							
Knowledge / Information		1, 27 5, 148			2,33							
Desire (Do something for self? / To do PA)			4, 102				1, 25	2, 28		1, 25 4, 110	2, 37	1, 22
Reward						2, 34 18, 576	1, 26					8, 235
Kick-start	8, 252			4, 123					1, 12 2, 30			
IMPACT OF INCENTIVE (Motivation)												
Primary (Valued)						2, 34						4, 98 8, 235
Secondary (Bonus / Practical Aspects)	5, 136	5, 140 7, 220	4, 109	1, 25 6, 180	3, 92 6, 190		2, 33	2, 42	4, 93 4, 117		4, 122	
MOTIVATORS												
Pedometer (Goal Setting / Targets / Monitoring)	3, 71	4,107	3, 66		3, 68 5, 128	9, 265	3, 60 4, 103	3, 89		2, 50 8, 227	2, 40	6, 174
Pedometer (Knowledge / Awareness)	3, 68	4, 106	3, 92		3, 79		3, 63	3, 86	2, 52	2, 46	3, 67	6, 172
Health Assessment (Monitoring / Knowledge)			6, 170	5, 131			5, 138	5, 146		3,60/4,99 7, 205	5, 138 9, 259/266	
Health Assessment (Accessibility)		7, 204					5, 128	6, 159		3, 82		8, 228
Support (Encouragement / Reinforcement /	6, 193		7, 206	5, 134		3, 81 / 89			5, 148	5, 148	10, 298	

Competition)			9, 270			5, 147				7, 214		
Support (Sharing Experience / Social Interaction)	6, 196	3, 85	7, 206 9, 270	5, 148		3, 81 5, 136			6, 158 9, 265	5, 151	10, 290	
Walking as a Lifestyle Activity (Realistic / Accessible)		6, 181 7, 227	10, 314			10, 300 16, 493			1, 11 12, 363	2, 29 5, 130	13, 398	5, 131 7, 191
OUTCOMES												
Health (Physical)	3, 108		10, 313	3, 89	5, 140	5, 155 6, 164		4, 105	6, 167	6, 186	4, 103	
Health (Psychological)						5, 157		4, 109	7, 190	6, 180	4, 103	5, 148
Gains (Knowledge / Awareness / Health Status)	3, 67	2, 36 / 57 6, 194	3, 83 7, 213		2, 60					6, 164		
Taking Responsibility			11, 339			11, 333		5, 144		6, 169 10, 305		
Positive Experience (Enjoyment/Accomplishment)	5, 153		10, 305	2, 38 6, 180	6, 174	2, 47 13, 404			6, 177	6, 186	3, 701 9, 265	
Reflection (Meeting Targets?)			4, 130	3, 89 4, 121					5, 125			
Improvement (General / Overall)	6, 182				4, 127					7, 191		
LIFESTYLE CHANGE												
Thought processes		5, 133	5, 162							2, 36 8, 264	5/6, 122	5, 132
Behaviour				2, 55		18, 545						2, 36 5, 133
Creating / Maintaining Habitual Behaviour		4, 117	5, 147	2, 62 3, 91		10, 304 11, 321					8, 222	
Future Intentions	4, 112 8, 253	8, 238	10, 306	4, 121 5, 164	6, 167	11, 321 20, 628	5, 148	5, 125	1, 22 9, 275			2, 42
BARRIERS												

Health Limitations					5, 142				2, 48 5, 125			
Time		6, 172	3, 82					5, 136				6, 156
Safety Issues		3, 84	6, 181			5, 127 13, 388					14, 414	
Responsibilities (e.g. Work / Family)	6, 168							5, 137		4, 111		
Job (Sedentary vs. Active)							4, 111			2, 29		
Weather / Season	5, 154	5, 162									14, 413	
Negative Self Esteem (negative thoughts / comparison) Lack of Confidence									3,80/6,177 7,200/8,231			
Accessibility / Suitability of PA Issues						4, 101/115 15, 473			9, 282			
Lack of support							3, 78					
Lack of motivation											6, 185	
EVALUATION												
Praise	7, 222				8, 250		6, 157		13, 388	9, 276		
Suggested Changes / Improvements / Constructive Criticism	4, 98				4, 118 8, 232/241			6, 168/183 8, 229/244	11, 321	9, 259	11, 343	
Practical Issues						7, 190	3, 86	2, 54				
ADDITIONAL THEMES												
Negative Impact? Expectations (Health / Reward Related)						15, 452		5, 150			3, 87	9, 256

Appendix 19: Semi-structured Interview Guide (12-months)

INTRODUCTION

- Gemma Hurst; Staffordshire University.
- Like last time, I just need you to read the information sheet and again sign the consent form.
- This interview will be conducted in the same way as your previous interviews. So again, I will be recording the interview. If you have any questions then feel free to ask.
- Like last time, I have a few questions written down to use as a guide but feel free to bring up anything you wish and also ask me any questions if you'd like and remember there are no right or wrong answers.

QUESTIONS

1. How have you been keeping over the past few months?
   - Diet (nutrition)
   - Physical activity
   - Emotional / mental health
   - Low stress levels
   - Non-smoker

2. Can I ask you if you are physically active at the moment?
   a. If yes, could you describe what activity you do in a typical week?
   b. If no, would you like to do more exercise; what barriers do you come up against that prevents you from exercising at the moment?

3. How do you feel about the amount of activity you do at this time?

4. Has your physical activity patterns changed since you have taken part in the Walk to Beijing project?
   a. If yes, how has the WTB project had an effect on your lifestyle?
   b. If no, is there anything that would help you to change your behaviour in relation to your physical activity levels?

5. Can I ask what your main motivations were to take part in the WTB project? What was your main aim/goal?

6. Do you think you have met your aim/goal?
    a. If yes, what were the main factors, which helped you to reach this goal?
    b. If no, what factors stopped you from meeting this goal?

7. Do you think the reward associated with the WTB project has had an effect on your behaviour?
    a. Why?

8. What are your overall opinions about the WTB project?
    a. Good / Bad / Indifferent? – Why?

9. Would you take part in the project again?

10. How do you feel about the set up of the project? Would you change anything?

11. Do you feel motivated at the moment to exercise?

12. What are your future intentions relating to your physical activity levels?
    a. Continue at same level / increase?

13. Do you think / are confident that you will be able to achieve your future goals?

CLOSE

- Thank you for coming today, it is very much appreciated,
- Have you got any questions for me before we finish?

Thank you.

Appendix 20: Additional Case Studies (Valerie and Louise)

Case Study Three; Valerie

1.1 Demographic Information

Valerie was a retired, 69 year old, white British, female who resided in Smethwick. Valerie reported being a non-smoker with no underlying health issues.

1.2 Quantitative Results: Health Status and Health Assessment Outcomes

Valerie also took part in four health assessments conducted at baseline, immediately post-intervention (at three-months), at six-months and 12-months (nine months post-intervention). During these health assessments, several objective and subjective measures were taken and assessed over time. Table A4 presents the measurements and outcomes of each health assessment.

Valerie's BMI ranged from 27.69 to 29.17kg/ m^2 which places her in the 'overweight' (WHO, 2000). Her BMI did decrease during the intervention period (baseline to three-months), however, this subsequently increased at the six- and 12-month health assessments. Valerie's waist-hip ratio of 0.89 at baseline remained fairly consistent across subsequent health assessments. However, according to the WHO (2008), for a female, Valerie's waist-hip ratio is classified as high (i.e. above 0.85). Valerie's waist circumference did decrease from 97cm at baseline to 91cm at 12-months, however, this figure still signifies a substantially increased risk to health (i.e. above 88cm for females) (WHO, 2008). Valerie's blood pressure measurements also indicated that she was suffering from mild hypertension at baseline (144/96mmHg) and this remained consistent at subsequent health assessments (BHS-IV) (Williams et al., 2004).

Table A4. *Health Assessment Outcomes: Valerie*

	Health Assessment			
	Baseline	**3-month**	**6-month**	**12-month**
Objective Measures				
BMI (Kg/m^2)	29.17	27.69	27.74	28.15
BMI Classification*	Overweight	Overweight	Overweight	Overweight
Waist-Hip Ratio	0.89	0.90	0.89	0.89
Waist Circumference (cm)	97.00	95.00	91.00	91.00
Blood Pressure (Systolic/Diastolic) (mm Hg)	144/96	137/86	146/75	145/87
Subjective Measures				
Stage of Change (TTM)	Maintenance	Maintenance	Maintenance	Maintenance
SF12v2 – Physical Component Score (PCS)	60.18	54.80	55.33	-**
SF12v2 – Mental Component Score (MCS)	48.28	54.37	50.45	-**
Perceived Health Status (EQ-5D)	70	70	100	100
Intentions (TPB)	3.0	3.0	3.0	3.0
Perceived Control (TPB)	7.0	7.0	7.0	7.0
Attitude (TPB)	3.0	3.0	3.0	3.0
Subjective Norms (TPB)	7.0	7.0	7.0	7.0

Note.* Based on WHO Classifications (Chapter 4, Section 4.2.5.24.2.5). ** Missing data

At each health assessment Valerie reported that she was in the maintenance stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

In relation to perceived health status as measured by the SF12v2, Valerie reported a higher than average (i.e. above 50) score of physical health at baseline. Although remaining higher than norm-based averages, this score then decreased at three- and six-months. In comparison, Valerie's mental health component score demonstrated an increase from baseline to three-months and subsequently decreased at six-months. At

baseline, Valerie's mental health component score was slightly below the norm-based average, her scores at three- and six-months were higher than average.

Perceived health status was also measured using the EQ-5D health thermometer. Valerie's reported a score of 70 (out of 100) at baseline and three-months which increased to 100 at her six- and 12-month health assessments. This indicates a rating of 'the best possible health state'. Therefore, although some objective measures of health status, such as, blood pressure, BMI, WHR and waist circumference indicated poorer health, Valerie's perception of her health state is positive.

In relation to the Theory of Planned Behaviour (TPB) Valerie scored positively across all four subscales at each health assessment, including, intentions, perceived behavioural control, attitudes and subjective norm. Valerie therefore indicated positive views towards: her intention to participate in physical activity in the near future; her capability in participating in moderate physical activity in the future; her attitudes towards participating in moderate physical activity in the future; and her belief that significant others were supportive of her physical activity behaviour.

As Table A4 shows, Valerie made improvements in two of the objective health assessment measures over the three-month intervention period (health assessment one versus health assessment two). Valerie was therefore eligible to receive the Silver award and elected to receive the grocery voucher.

As mentioned previously, in order to be eligible for any reward participants were required to record the number of daily steps taken throughout the intervention period. Valerie reported walking a total of 412,890 steps over the three-month intervention period, approximately 4,588 steps per day, which equates to an average of 1.8 – 2.3 miles per day over the intervention period.

During the baseline health assessment participants were asked to report the extent to which (not at all; a little; a lot) intervention components influenced their decision to take part, including the: pedometer; reward; support; town competition; and link to the Olympic Games. Valerie reported that the support and pedometer components of the intervention influenced her decision to take part 'a lot', with other intervention components, including the reward, town competition and the link to the Olympic Games having no influence ('not at all').

1.3 Qualitative Results: Semi-structured Interviews

This section will report the results from qualitative data collected from Valerie at six- and 12-months. Objective and subjective measures of health status and additional information collected during health assessments at baseline, three-, six- and 12 months will also be referred to. Where quotations are provided in the text they will be labelled by time of collection (six- or 12-months).

The following analysis is structured around five super-ordinate themes that emerged from the data, each with a number of sub-themes:

1. **Motivation for Participation**
2. **Influence of Intervention Components**
3. **Past, Present and Future**
4. **Barriers to Physical Activity**
5. **Intervention Evaluation**

The following section will discuss each super-ordinate theme in turn, including sub-themes where appropriate. Each super-ordinate theme will be presented, incorporating direct quotes from Valerie to illustrate and describe opinions held. In addition, reference will also be made to the quantitative data collected, where appropriate.

1. Motivation for Participation

This theme examines Valerie's initial and continuing motivation for participation in the WTB intervention. For Valerie, this includes particular life events and feelings of obligation to continue.

Life Events

Certain life events seem to have spurred Valerie on to seek a health programme that would promote physical activity and exercise. In Valerie's case, the life event was taking part in a dance performance:

"I wanted to do it because of this War Time Dance I'm putting on and I thought it would keep me motivated to keep exercising"

(6m, 1-2; 27-28)

Valerie expanded upon this and incorporated her desire to lose weight in describing her reasons for participating in the WTB intervention. This was still related to the life event which prompted Valerie to seek a health promotion programme:

"Well, I wanted to lose weight. Every year I go through this, 'cos this is my eighth year putting on a War Time Dance, and every year I need to lose a bit of weight to get into the uniform…and when I saw this project, I thought that'll do me. I'll do that project and yes, it kept me motivated, it did"

(6m, 11; 333-336)

Obligation

Valarie's motivation for continuing her WTB participation seemed to be embedded in her investment in the programme and subsequent feelings of obligation:

"I did because I felt obligated to the programme so yes, it did keep me motivated because I thought I'd got to put some answers down on the paper and, yes"

(6m, 3; 74-76)

Whilst Valerie reported feeling an obligation to continue with the intervention, her goal was ultimately to lose weight in order to take part in, and 'look nice' during, a dance performance:

"I would have felt guilty if I hadn't kept it up and I, you know, I don't like starting something I can't finish. So I felt that I was stuck and I was a good stone and a half overweight and that's a hell of a motivation and I wanted to look nice and slim for November 10th because I run the show and I wanted to look nice in my naval uniform"

(6m, 4; 113-117)

This goal of losing weight is supported by objective measures of health status collected during Valerie's baseline health assessment. At baseline, Valerie's BMI of 29.17kg/ m^2 placed her in the 'overweight' category (WHO, 2000, 2013). Her waist-hip ratio was also classified as high, and her waist circumference signified a substantially increased risk to health (i.e. above 88cm for females) (WHO, 2008). Valerie therefore, had a clear weight loss goal to aim for and she chose to take part in the WTB intervention to motivate her towards achieving this goal.

As this theme demonstrates, Valerie was both intrinsically and extrinsically motivated to engage in physical activity and the WTB intervention.

2. Influence of Intervention Components

This theme depicts the intervention components that Valerie perceived to be motivating and those that played a non-influential role in either promoting or sustaining participation.

Motivating Components

According to Valerie, the health assessment was a key motivating component of the WTB intervention. Valerie appeared to be highly motivated by being made accountable to someone else whilst demonstrating intrinsic motivation to take part:

"Yeah....well, because you knew you'd got to come back and get your weight measured and everything and that kept you going? That kept me motivated but not so much because I had to come back and face anybody because you can cheat, can't you, you know. No, it was personal to me to do this project because it kept me motivated to keep well, keep strong and to keep sharpening up. Like my own project, I did it because I wanted to"

(6m, 11; 322-327)

This was reiterated at the 12-month health assessment where Valerie demonstrated internal motivation for participating in the intervention, however, the need for monitoring and support from others was highlighted:

"I do it for my own benefit and I'm not happy unless there's someone watching over me. If I've got somebody to answer to then I'll continue. I've been waiting for this [follow-up] letter to arrive"

(12m, 8; 236-237)

The health assessment was a key component in keeping Valerie motivated. In this quote, Valerie also makes reference to the feelings that are elicited as a result of having to 'answer' to another individual. This preference is further supported through her need to be monitored by others in engaging in other health behaviours:

"Well it [the health assessment] keeps me motivated. I mean I've got a diet nurse as well and I see her about once every two months. It's just having somebody to answer to, 'cos you feel guilty if you don't do anything. I just like to have somebody at the back of me and, of course, because I'm doing this play I really want to get down to just under 10 stone and I will look just right"

(12m, 9; 252-256)

Non-Influential Components

For Valerie, the incentive associated with the intervention was not an influential or motivating factor. The following quotation demonstrates her view of the financial incentive:

"Oh, god no! No, I wouldn't have taken it on for that. I don't think it was worth it at all, you know, for the reward"

(6m, 4; 104-105)

At her 12-month health assessment further explained her perceptions of the impact of the financial incentive. Here, she identifies that participation is *'worth a lot more than that [the incentive]'*. This quote clearly indicates that Valerie was not influenced by the potential of receiving up to £40.00 by taking part in the intervention:

"It's… I can't say it's an incentive because it isn't an incentive for me. I think it's worth a lot more than that because you do a lot of work. You wake up every day and you think well I did last year, I wake up every day and I think I must go for a walk, I'll get it in at 4 o'clock and I walk round. You don't think, I'd better walk round today 'cos I want to get that £40.00"

(12m, 8; 226-230)

Her views relating to the financial incentive is also supported by Valerie's continued participation in the WTB intervention as no financial incentive was offered at the six- and 12-month health assessments. When discussing the potential impact of the financial incentive on 'others', Valerie felt that the view she held would also be shared:

"Well I would think it would be important but I can't see anybody who's down at heel or down on their luck that's going to do a programme for 14 weeks for £20.00. I don't think so"

(6m, 5-6; 154-156)

As Table A4 shows, Valerie made improvements in two of the objective health assessment measures over the three-month intervention period (health assessment one versus health assessment two). Valerie was therefore eligible to receive the Silver award and elected to receive the grocery voucher. At her six-month interview, Valerie expressed her views on receiving and spending the reward:

"Oh yes! Well, I thought the reward was OK, you know, I spent it in Asda and yes it did, it came in very useful. Yes it did, I bought a nice item with it, yes. It did come in useful, yes, 'cos nobody gives you anything these days, do they?"

(6m, 5; 145-147)

However, it was clear that, to Valerie, the reward was a 'bonus' and it was not an important factor that influenced her motivation:

"It's a bit of a bonus if you get a little bit. I didn't expect that. It was weeks and weeks; I'd completely forgotten it anyway. No, I wouldn't do it for the reward because it's hard work. You wouldn't do it for the reward"

(6m, 6; 162-164)

The views expressed by Valerie in relation to the intervention components which influenced her motivation to take part in the WTB intervention was also reflected in the information collected during her baseline health assessment. Valerie reported that the support component of the intervention influenced her decision to take part 'a lot', with other intervention components, including the reward, town competition and the link to the Olympic Games having no influence ('not at all').

3. Past, Present and Future

This theme examines Valerie's physical activity history, current levels and perceptions and future intentions. Within this theme, the impact of the WTB intervention is also considered.

History

In relation to physical activity history, Valerie reported being active *'all my life' (6m, 8; 238).* For Valerie, dance, as a form of physical activity, is part of her life and a habitual behaviour:

"Yes, I've always done it. I was a working dancer. I toured the country as a dancer so I'm not going to be an old woman in a rocking chair until I'm 90 and I probably won't be like that then! You know, I shall always, always do dance. There'll always be some dance class that I will either run or I'll go to somebody else's 'cos that's been my life since I was eight"

(12m, 12; 356-360)

Valerie also reflected upon her past 'shape' and health status and compared this with her current perceptions. This comparison served as a motivator for Valerie:

"Well that's what's motivating me most of all because I'm 18 years older than when I did it [dance performance]. I don't think my weight's any more than when I did it [before]. In fact, I look at the pictures now and I think I'm in better shape now than I was then"

(12m, 11; 318-320)

Current Status

During qualitative data collection at 12-months, Valerie was asked to describe her current levels of physical activity and reported:

"Well Monday evening I do salsa fit, not salsa dancing with a partner, just salsa fit class…You don't need a partner, it's really good exercise. They do it here. Tuesday I try to walk as much as possible, Tuesday's a free day for me really. Wednesdays I teach tap to pensioners and that's a really good workout for me, I'm doing it really for me as well as for everybody else. Thursday I do a tea dance, Friday is another tea dance somewhere else"

(12m, 2-3; 59-603; 3; 65-70)

At 12-months, Valerie was clear that her current activity levels were greater than previously (six-month interview):

"Well I'm doing even more [activity] now, so you know, I'm going to do this play and I feel very lucky that they've asked me back"

(12m, 1; 26-27)

Valerie also reports the importance of remaining physically and psychologically active:

"So my mind's busier than my body, I suppose, yes. My head works busier than my body but I try to keep everything busy. You know, everything in working order"

(12m, 4; 103-105)

This is also supported by information related to stage of change collected at each health assessment (baseline, three-, six- and 12 months). Valerie reported that she was in the maintenance stage of the TTM (Prochaska & DiClemente, 1982) at each health assessment, suggesting that she had engaged in physical activity behaviours for a period of six-months or more.

When discussing health her health status, Valerie reported being pleased with improvements:

"I am pleased. I am pleased because I have really stuck at it. Plus I've started to do tap dancing classes again, which I hadn't done for ten years"

(6m, 4-5; 123-124)

This qualitative data is also both supported and contradicted by perceptions of health status collected during Valerie's health assessments. Self-reported health status as measured by the SF12v2 indicated that Valerie scored higher than average (based on UK norm-based scores) on the physical health component score, however, this score decreased from baseline to three-months with a subsequent slight increase at six-months. In comparison, Valerie's mental health component score was below average at baseline (48.28), increased to above average at three-months (54.37) and subsequently decreased (whilst remaining above average, 50.45) at six-months. Valerie's score on the EQ-5D health thermometer demonstrated an increase from 70-100 across her health assessments illustrating a perception of excellent health.

According to Valerie, the intervention did not have an impact on Valerie's physical activity behaviour, particularly in relation to walking as a lifestyle activity. However, she revealed that the intervention played a role in maintaining motivation and pushing her to 'work harder' in order to achieve a self-selected goal, i.e., weight loss for a dance performance:

"Well, it didn't have an impact because I'm doing it anyway. It just kept me motivated because of the project I've got in November, I wanted something to force me to do it harder, work harder"

(6m, 6; 170-172)

In relation to this goal, Valerie's BMI did decrease during the intervention period (baseline to three-months); however, this subsequently increased at the six- and 12-

month health assessments. Valerie's waist-hip ratio of 0.89 at baseline remained fairly consistent across subsequent health assessments. However, for a female, Valerie's waist-hip ratio is classified as high (i.e. above 0.85) (WHO, 2008). Valerie's waist circumference did decrease from 97cm at baseline to 91cm at 12-months, however, this figure still signifies a substantially increased risk to health (i.e. above 88cm for females) (WHO, 2008).

Despite Valerie reporting the intervention as having little impact in relation to walking, in order to be eligible for any reward she was required to record the number of daily steps taken throughout the intervention period. This therefore provides an estimation of the Valerie's current levels of activity.

According to Valerie, the intervention had an influence on her motivation, rather than actual behaviour:

"But, you know, this motivation is because I've got somebody to answer to but I'd still exercise anyway but I perhaps wouldn't be so manic about it"

(12m, 11; 320-322)

Future Intentions

When discussing Valerie's future intentions relating to physical activity, she stated that she was confident in her ability to continue to be physically active and draws on previous experiences of bouts of forced inactivity:

"Yes, definitely. baring accidents, yes. The only time I wasn't physically active for 6 months was when I broke my wrist and my god that was terrible"

(12m, 12; 374-375)

Valerie also emphasised the psychological impact of being unable to take part in usual activities:

"I know what it feels like to not be able to wash yourself and dress yourself and it was a very depressing time, extremely depressing. I couldn't play. I play the organ, the piano, and I never thought I'd play again"

(12m, 13; 281-382)

In addition, Valerie's physical activity history lays the foundation for Valerie's attitude towards future participation in exercise:

"Well I've always been a professional dancer, so I've always been an athlete. I was an acrobat years ago and this is from when I was sort of 12, so there's no question of me never doing exercise. There's no question at all. I shall always do exercise"

(12m, 6; 183-186)

This is further supported by data collected in relation to the Theory of Planned Behaviour (TPB) at each of Valerie's health assessments (baseline, three-, six- and 12-months). Valerie scored positively (7 out of 7) across all four subscales including, intentions, perceived behavioural control, attitudes and subjective norm. Valerie therefore indicated positive views towards: her intention to participate in physical activity in the near future; her capability in participating in moderate physical activity in the future; her attitudes towards participating in moderate physical activity in the future; and her belief that significant others were supportive of her physical activity behaviour.

When discussing reasons why some people cease being physically active, Valerie stated:

"I don't know. If you're asking my opinion, people get to a certain age and decide, 'I'm over 40 now, I can't do all that any more' but you can. You can…I'm 68 now but it doesn't mean I can't, you know"

(6m, 9; 253-254; 260)

Valerie agrees that dancing keeps you fit and that those who participate in dancing have a different attitude in relation to remaining active as you get older:

"Well it does [keep you fit] and the attitude's different. I see people, you know, in their 60's and they don't look older than 60 but I think it's attitude, I think you've got to keep going"

(6m, 9; 275-277)

For Valerie dancing is an accessible and enjoyable form of activity and the environment in which carries out this activity is much more pleasurable that other forms of activity, such as, going to the gym:

"Well I'd rather go to a dance class than go and pump iron, with all that horrible loud music. I cannot stand it. Why they play such loud music in those places I shall never know"

(12m, 12; 366-368)

4. Barriers to Physical Activity

This theme relates to the barriers to participation in physical activity experienced by Valerie, including, the weather or season and access to appropriate facilities.

Weather / Season

Valerie cited the weather and current season as a barrier to participation in physical activity. For Valerie, the weather needs to be conducive to participation in walking in particular. For example, in response to whether Valerie's activity levels have changed since taking part in the WTB intervention, she reported:

"Yes. I haven't walked as much but then again we've just come out of winter haven't we so I suppose that's why I haven't walked so much. I shall start walking again when the weather gets nicer. I'll definitely do that block walk that I do"

(12m, 4; 112-115)

Similarly, Valerie expresses her intention to start walking again once the spring and summer season begins:

"Yes, it's [usual walk] about 2 miles, it's got to be about two miles. So I shall definitely be doing that again when May is on us"

(12m, 4; 121-122)

This view is consistent with literature suggesting the weather needs to be conducive to participation in physical activity for a number of individuals (Tucker & Gilliland, 2007).

Appropriate Access

Another inhibitory factor to Valerie's participation in other physical activity behaviours was a lack of appropriate facility provision and access. For example, Valerie expressed her desire to participate in swimming as another form of physical activity:

"I'd like to get back to swimming again but I don't' like it here [swim centre]"

(12m, 9; 277)

Valerie elaborated on the reasons why the local swim centre is not an appropriate facility for her and makes comparisons with a previously utilised facility:

"It's always packed here and I don't like it. This one was a private one and, you know, it was a night school swimming class and they could only take 12 at a time and you could swim. It wasn't too packed. You come here and you don't' know what you're going to get. I miss swimming"

(12m, 9-10; 283-286)

Valerie explained why access to her preferred swimming facility was removed and reveals her subsequent disappointment that the facility was not restored. She acknowledges the role the facility played in meeting the needs of local, and in particular, older people:

"Well, we're very sorry… well, the roof fell in. I wasn't there but part of the roof fell in and they hadn't had it repaired and now the whole place is going to close down and will be a housing estate, which I think is absolutely ludicrous because there's a lot of people there, you know, old people that actually needed that swimming pool and it's just been whisked away"

(12m, 10; 294-298)

5. Intervention Evaluation

This theme draws on Valerie's overall evaluation of the WTB intervention and focuses on her suggestions for improvement.

Intervention Improvements

When reflecting on the design and operational aspects of the intervention, Valerie felt that there wasn't enough face-to-face contact stating that it was *'a bit faceless'*. Here, Valerie highlights that she had to work hard throughout the intervention and suggests that 'others' who were less motivated would have potentially given up:

"Well, you know, I've worked at it but I bet a lot of people gave up half way through. So I don't think that there's a lot of motivation and it's a bit faceless as well. It's a bit faceless"

(6m, 12; 359-361)

This view was further expressed through Valerie's view that additional support, beyond three-monthly health assessments, would have been helpful:

"Also, you're just doing it on your own, so, some more support might have been helpful"

(6m, 10; 315-316)

A further criticism made by Valerie was in relation to the quality and functioning of the pedometer:

"… I thought the pedometer was a bit of a nightmare"

(6m, 3; 75-76)

Valerie was clearly disappointed in the functioning of the pedometer. This was further explained when considering that during her baseline health assessment, Valerie reported that the pedometer influenced her initial decision to take part in the intervention 'a lot'.

The following quotation illustrates how Valerie overcame the issues she experienced with the pedometer in relation to continuing to record the number of steps she took during the intervention period:

"Mmmm… but when it was working I just noted how many steps I did, like 2,500 when I do my usual two mile walk. So when it had stopped I just put the 2,500 down because I'd done the same walk before, so I knew roughly how many steps. A lot of it had to be guesswork because the pedometer didn't work"

(6m, 3; 88-91)

On her pedometer report card, Valerie recorded walking a total of 412,890 steps over the three-month intervention period, approximately 4,588 steps per day. Valerie had estimated that her 'usual two mile walk' equated to approximately 2,500 steps. This may be an underestimation as Hill et al., (2003) suggests that 2,000-2,500 steps equates to approximately one mile. Therefore, Valerie's step count over the intervention period may be considered to be a conservative estimation.

Overall Experience

Valerie rated the overall intervention experience positively, reiterating how being monitored by others was a helpful component of the intervention:

"Yes it was positive for me because I've got somebody to answer to"

(12m, 9; 263)

In the following quotation, Valerie reported that she is pleased to return and take part in a second phase of the WTB intervention. Again, she reiterates how being monitored by others is an essential motivating component of the intervention and her future hopes for making use of a pedometer. She also reports her enjoyment of taking part and having *'someone to answer to'*:

"I'm just glad to be back, yes. It's nice because you work a little bit harder because you've got to answer to somebody in a couple of months time and I hope I get a pedometer…Because that does motivate you as well. You know you set it and you put it on your thing… yes. I enjoy it, I enjoy having somebody to answer to and…yes keeping motivated"

(12m, 14; 240-422, 428-430)

1.4 Summary: Valerie

In relation to the quantitative data collected, Valerie received the Silver award which meant that she had attended her baseline and three-month health assessment, made improvements in one or two more health measures, and submitted a pedometer report card. Over the intervention period (baseline to three-months) Valerie made improvements to objective measures of health status, including BMI, waist circumference and blood pressure. In relation to subjective health status, improvements were made during the three month intervention period in the mental health component scores of the SF12v2. Valerie's perceived health status according to the EQ-5D was maintained during the intervention period scores in all TPB constructs were maintained (intentions; perceived control; attitude; and subjective norms). Valerie reported being in the 'maintenance' stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

Qualitative data suggests that the intervention influenced Valerie's levels of motivation to continue to be active rather than her actual behaviour in terms of increasing levels of lifestyle activity through walking.

Case Study Four; Louise

1.5 Demographic Information

Louise was a 63 year old, white British, female who was a Counsellor and resided in Tipton. Louise reported being a non-smoker with no underlying health issues.

1.6 Quantitative Results: Health Status and Health Assessment Outcomes

Louise took part in four health assessments conducted at baseline, immediately post-intervention (at three-months), at six-months and 12-months (nine months post-intervention). During these health assessments, several objective and subjective measures were taken and assessed over time. Table A5 presents the measurements and outcomes of each health assessment.

Louise's BMI ranged from 18.70 to 19.15kg/ m^2 which places her within the 'healthy weight' classification (WHO, 2013). Louise's WHR decreased from 0.77 at baseline to 0.68 at 12-months. This decreased was mirrored in the waist circumference measurements taken at baseline (71cm) and at 12-months (65cm). Louise's WHR value and waist circumference, according to the WHO (2008) are not considered to be high risk. Similarly, Louise's blood pressure measurements were also considered optimal at each health assessment (BHS-IV) (Williams, et al., 2004).

Table A5. *Health Assessment Outcomes: Louise*

	Health Assessment			
	Baseline	**3-month**	**6-month**	**12-month**
Objective Measures				
BMI (Kg/m^2)	19.15	19.15	18.83	18.70
BMI Classification*	Healthy Weight	Healthy Weight	Healthy Weight	Healthy Weight
Waist-Hip Ratio	0.77	0.73	0.72	0.68
Waist Circumference (cm)	71.00	67.00	68.00	65.00
Blood Pressure (Systolic/Diastolic) (mm Hg)	107/57	101/55	96/53	123/62
Subjective Measures				
Stage of Change (TTM)	Maintenance	Maintenance	Maintenance	Maintenance
SF12v2 – Physical Component Score (PCS)	-**	55.88	54.58	-**
SF12v2 – Mental Component Score (MCS)	-**	51.94	60.12	-**
Perceived Health Status (EQ-5D)	75	80	80	85
Intentions (TPB)	3.0	3.0	3.0	3.0
Perceived Control (TPB)	7.0	7.0	7.0	7.0
Attitude (TPB)	3.0	3.0	3.0	3.0
Subjective Norms (TPB)	7.0	7.0	7.0	7.0

Note. * Based on WHO Classifications (Chapter 4, Section 4.2.5.2). ** Missing data

In relation to the TTM, Louise reported that she was in the maintenance stage at each health assessment, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

Perceived health was measured using the SF12v2 health survey (Brazier & Roberts, 2004). As Table A5, illustrates, Louise reported a higher than average score (i.e. greater than 50) of physical health at three- and six-months (data were missing for the baseline and 12-month time points). This was mirrored in Louise's mental health component

score, which increased from three- to six-months, remaining higher than norm-based averages.

Perceived health status was also measured using the EQ-5D health thermometer which requires participants to rate, on a scale of 0-100, how they feel at a specific point in time. Louise reported scores of between 75 and 85 with scores increasing at each subsequent health assessment.

In relation to the Theory of Planned Behaviour (TPB) Louise scored positively across all four subscales at each health assessment, including, intentions, perceived behavioural control, attitudes and subjective norm. Louise therefore indicated positive views towards: her intention to participate in physical activity in the near future; her capability in participating in moderate physical activity in the future; her attitudes towards participating in moderate physical activity in the future; and her belief that significant others were supportive of her physical activity behaviour. This reflects her stage of change according to the TTM.

As Table A5 shows, Louise made improvements in three of the objective health assessment measures over the three-month intervention period (health assessment one versus health assessment two). Louise was therefore eligible to receive the Gold award and elected to receive the high street shopping voucher.

Louise reported walking a total of 636,433 steps over the three-month intervention period, approximately 7,071 steps per day. This equates to 2.8 – 3.5 miles per day over the intervention period.

During their baseline health assessment participants were also asked to report the extent to which (not at all; a little; a lot) intervention components influenced their decision to take part, including the: pedometer; reward; support; town competition; and link to the Olympic Games. Louise reported that the support component of the intervention influenced her decision to take part ‘a lot’, with other intervention components having no influence on her decision (‘not at all’).

1.7 Qualitative Results: Semi-structured Interviews

This section will report the results from qualitative data collected from Louise at six- and 12-months. Where appropriate, reference will be made to the objective and subjective measures of health status and additional information collected from Louise during health assessments at baseline, three-, six- and 12 months. Where quotations are provided in the text they will be labelled by time of collection (six- or 12-months).

The following analysis is structured around four super-ordinate themes that emerged from the data, each with a number of sub-themes:

1. **Intervention Impact**
2. **Intervention Components**
3. **Physical Activity Behaviour**
4. **Overall Intervention Perceptions**

The following section will discuss each super-ordinate theme in turn and its relationship with sub-themes will be highlighted. Each super-ordinate theme will be presented, incorporating direct quotes from Kate to illustrate and describe opinions held and where appropriate reference will be made to the quantitative data collected.

1. Intervention Impact

This theme examines the impact of the WTB intervention on Louise's behaviour and considers her motivation for taking part in this intervention.

Honesty

Louise was honest in recalling the impact of the WTB intervention on her behaviour:

"To be honest, I think we carried on as normal. Except that we had the thingamabobs [the pedometer]"

(6m, 3; 61-62)

This was reiterated during Louise's 12-month health assessment. However, she did state that the intervention influenced her thought processes in relating to walking:

"No it didn't [have an impact on behaviour], but it did make me think. Which I think is a good thing. It did make me think about walking and that it's good to walk as much as possible, which I already knew, but it underlined it. So it's good to walk instead of riding/driving which again, I already knew. These days there's the added importance that we really shouldn't be using cars if we can really possibly help it anyway"

(12m, 6; 157-161)

Motivation

Louise's initial motivation for taking part is also related to the impact of the WTB intervention. In the following quotation provided during her 12-month health assessment, Louise described why she initially signed up for the intervention:

Well, I think just because we got a letter coming through the door suggesting it and I thought oh, they want to do some kind of research – well I can do that, I don't mind that if it's going to be useful. That's really why I did it, just because I could and because they were doing the research and I thought it's a good thing to join in, if it's useful and if the data is useful. ***But I'm not sure that mine is very useful actually because I haven't really changed my lifestyle.*** *But it has made me think and I think that's a really good thing and maybe that's the big thing it does with everybody and if it does that it's doing a good job isn't it"*

(12m, 7; 175-182)

This links with Louise's assessment that the intervention had little impact on her behaviour but influenced her thought processes. In comparison, during her six-month health assessment, Louise reported that health monitoring and taking responsibility for you own health:

"It seemed quite a good idea. It seemed there was no harm in it and that it's always a good idea to actually look at what you're doing for health. I think I'm fairly… I'm more aware I suppose, the older I get, that we have to… well, I've always known that we have to take responsibility for our own health, so as I get older I'm more and more aware that I need to look at that on an ongoing basis"

(6m, 2; 43-48)

2. Intervention Components

This theme relates to the Louise's use of different intervention components. Certain components were perceived in a more positive light than others and this perception changed over time.

The Pedometer

When discussing the pedometer, Laura stated that she used it as a way of 'working out' her levels of walking:

"I thought they were a good idea actually because you can learn… I mean, for me 9,000 was five miles 'cos I probably have a long stride. When I'm going, not ambling but when I'm "going" I do walk fast because I always use walking… I don't like walking slowly anyway but I use that anyway as a form of exercise and I think, mainly particularly me, I decided already it was time to walk and not to use the car. You know, if 'x' amount of, I don't know, you just nip somewhere in the car where you can actually walk. So I'd probably already decided that but it was very interesting having a counter because once I worked out… I know that I do a five mile, well it's a two and a half mile walk actually, so there and back… so I could work out then"

(6m, 3; 68-77)

Louise estimated that 9,000 of her steps equated to approximately five miles. This figure is roughly accurate as according to Hill et al. (2003) between 2,000 and 2,500 steps is equivalent to walking one mile. Over the course of the intervention period Louise reported walking approximately 7,071 steps per day which equates to 2.8 – 3.5 miles.

Louise stated that the pedometer didn't necessarily make her walk more but made her more aware of her behaviour:

"Also, if you don't you realise, if you're doing probably less, you realise you actually need to be walking more. So, it wasn't that I walked more, I don't think, but probably I did, unconsciously, but consciously I wasn't thinking "oh I've got to go out and walk" or anything like… I wasn't doing that. Maybe it made me more aware and instead of nipping in the car I nipped on my feet"

(6m, 3-4; 89-94)

Louise also reported that her use of the pedometer subsided. This may be linked to her previous discussions around the way in which she used the pedometer to measure her usual levels of walking. Consequently, once her usual walking routes were measured the pedometer was no longer required:

"No. I did… I haven't used it for quite a long while. I might start again but you do get fed up with it, always clipping it on and then… I'm not sure they go on forever being accurate as well but, yes"

(6m, 11; 326-328)

The Reward

For Louise, the presence of a reward was not a factor that influenced her initial or continued motivation. Louise believed that because of her current health status, (i.e., healthy weight (BMI category), optimal blood pressure, WHR and waist circumference signifying no risk to health) she would not be eligible for a reward. As a result, the presence of a reward was not a motivating factor for Louise, instead 'health' was enough of an incentive:

"Well, I didn't think that I would [receive a reward] probably… Because I didn't think there would be much change in anything, because I was already doing what I was doing, I didn't think there'd be any change. To be honest, it wasn't an incentive. I didn't do it for that. I think it's enough incentive… you know, your health itself is enough incentive but it was very nice when, at the end, I actually did get some things"

(6m, 6; 179-184)

Louise, did however, suggest that the reward could be a 'kind of acknowledgement' for some people, especially if their self worth is low:

"I suppose it is almost… it is always… it's kind of an acknowledgement I suppose. So, I guess it's an acknowledgement and that's nice and I guess as well, if you really worked hard, if you really had to come out of your comfort zone and work hard and do things you hadn't done before…It's good for it to be acknowledged, I guess, and if that reward is a way of acknowledging to make you feel…'cos I think self worth is probably quite down for lots of people, for us all at times"

(6m, 7-8; 213-225)

The Health Assessment

Louise valued the health assessments as a vehicle for discussing health related topics:

"It was having someone who you could actually say 'oh yes, what about such and such'. So things like that it was useful, having a sounding board almost, you know"

(6m, 4; 108-110)

She also stated that the health assessment was a setting that was 'conducive' to asking any questions:

"So I was fairly aware of nutrition but because he was there it was possible to ask questions which, in a non… in this setting it's easy to do that, whereas in another setting it might not have been so easy. So it was very conducive to ask him questions"

(6m, 6; 169-172)

Louise also praised the role, knowledge and experience of the health assessor:

"And he's [the health assessor] able to communicate it and he can answer questions and doesn't fob you off, so he doesn't pretend he knows something he doesn't, which is always irritating with people. So I could ask anything. I've just had some quite interesting information, just talking to him"

(12m, 10; 266-269)

3. Physical Activity Behaviour

This theme relates to Louise's physical activity history, current levels and perceptions and future intentions.

Physical Activity History

During discussions Louise revealed that she only started exercising when she was forty years of age. Louise also described her reason for starting exercising:

"I started swimming because I had surgery on my hand and I think they heaved my around on the table being skinny a bit and I don't know whether or not...but when I'd finished, my back felt very weird. I some odd feelings along my spine and I said to the surgeon when I went back to see him, I just said actually, 'sorry but I have these odd feelings along my spine'. (I still do) almost like when you run your finger down your back. So he said well we'll x-ray it and he x-rayed it and it didn't show anything except the normal wear and tear and he sent me to a physio[therapist] and the physio[therapist] said I had a scoliosis, but most people probably do [have it] a bit. But he said it was marked and he told me to do all these exercises, three times a day and I knew I wouldn't, because you know, you've got kids, running around, taking them back and forwards to school – they were still in junior school"

(12m, 3-4; 74-85)

Louise described as how it was difficult for her to undertake the prescribed exercises, whereas, swimming was an alternative activity that she felt she could participate in:

"So, I just had to say to him, he didn't like me 'bet you don't do all these sort of exercises'? and he said, 'Well I haven't got a bad back and anyway, I swim' and so I said, 'Oh, well I swim…' and then I got into it, so I carried on"

(12m, 4; 91-93)

Louise reported how she gradually increased her swimming intensity:

"Well to start with of course you don't swim as far. I remember when I first did it, I hadn't swum since I was 15 and I could only do breast stroke. I'd only taught myself that, so I didn't have a clue and I could get just about up the top and back. [laughter] And then I gradually increased it. There we are. And then I eventually decided that I needed to do it for health, so I carried on anyway"

(12m, 5; 125-129)

Current Physical Activity Levels

Louise's current levels of physical activity as described during qualitative discussions is supported by the information collected during her health assessments which categorised her in the 'maintenance' stage of the TTM (Prochaska & DiClemente, 1982):

"Well, Sunday, I don't usually start on Monday, I usually walk 5 miles. I walk somewhere and back, because I can, unless it's absolutely pouring with rain. Monday to Friday I usually swim for about half an hour – early morning swimming. Tuesday, because of what I'm doing, I probably walk at least three miles, it might be more – I don't know, I haven't actually measured it, but it's not one distance it's probably kind of a mile hear and a mile there. I don't really know, it's one of those things – kind of here and back from the station. The rest of the time exercise is just… I always try to walk if I can rather than drive. So if it's not more than a mile, well even if it was more than a mile, unless I've got something heavy to carry, I'll walk. Sometimes we go walking on a weekend or we do some sort of walking on the weekend. Sometimes we go on the hills. It's lovely on the hills in the snow"

(12m, 1-2; 12-23)

Louise reported that she was happy with her current levels of physical activity, however, she 'always thinks' that she could be doing more:

"I probably do enough. I always think I can walk more, because weight bearing… more weight-bearing exercise. I swim because I can and it gets it down, so even if it's pouring with rain, or whatever the weather's doing, you can fall out of bed and go and do it. So I do that because I can and that's kind of a backbone which I know I've done. I think it's always good to probably walk more than you do, especially as I say because of weight-bearing"

(12m, 2; 29-34)

Physical Activity and Exercise Motivation

When discussing Louise's main motivations for participating in exercise and physical activity, she stated that she 'didn't actually enjoy swimming'. However, she feels that it is 'worth it':

"I don't actually enjoy swimming….[laughter]… especially – it's very boring. I hate the gym. Absolutely hate it – it's even worse. But I know now as I get older – it's funny, I can crawl out of bed and I have to tell myself…. I used to know I was going to do it, so I'd just get up and do it. But now, I almost sometimes think 'I really don't want to do this'. But I know that when I've done a couple of lengths I begin to feel it's worth it and by the time I'm out, I know that it's worth it. Whereas when I was younger, I only started when I was forty I suppose, I didn't really notice much difference. People used to say, 'Oh I feel energised', I used to not feel any more especially energised than I was, but I wouldn't say that it's not so much feeling energised, but feeling that it's worth it; feeling that you've done it"

(12m, 2; 40-50)

In comparison to swimming, Louise stated that she 'loved and enjoyed walking':

"Yeah, you feel … I suppose it is more energised really. Walking is great. I enjoy walking. But I love walking on the hills and nice places. If I'm going from a to b, it adds something; I enjoy the walking. Not so much on the road, but I enjoy having done because I know it's a useful thing to have done and I actually enjoy the feeling of walking. I don't like sitting around"

(12m, 3; 56-60)

Louise also describes her approach to ensuring continued participation in physical activity and exercise:

"You have to fit your exercise into your life, you won't keep it up otherwise, so it's got to be accessible and that's why I started swimming early a long time ago, 20 odd years

ago, and I can do that before anything else happens and then go to work, or whatever. Whereas if I'd had to swim after work, I just never would have done it"

(6m, 10; 290-294)

Here, Louise demonstrates the value she places upon maintaining her levels of physical activity and also participating in exercise is something you can take control of:

"It is all physical yes. But people don't realise that when they do something and they take control of the situation, like whatever you're doing… if you're doing exercise – whichever way you choose to do it, you actually choose to do it and fit it into your life in a way that you can. That makes a difference because… it's an achievement isn't it"

(12m, 12; 325-329)

Future Intentions

When discussing Louise's future intentions relating to physical activity, she stated that she was confident in her ability to continue to be active:

"Well, yes because it's about health isn't it"

(6m, 10; 312)

In relation to the future, Louise was aware of the need to become more aware of, and 'pay more attention', to her own health as she got older:

"Well I think the older you get the more you have to pay attention really; make sure you keep it up and stuff. Keep up exercise and don't make excuses for not doing it. I think the more we get older, the more we have to be aware that we are getting older and take responsibility for our health as far as we can. If you get 'flu' well, unless you were around someone that you didn't need to be around who also had 'flu' – that happens, but there are other things that happen like when I did whatever I did to my back this time, it was only slight; it was only a muscle I think, but I was just a bit careless. I need to be more aware about that, but that's just a small thing there are other things if you're not aware, the older we get, we're going to get more stuff. So, it's just common-sense I think to be as healthy as possible really"

(12m, 14; 366-376)

Louise was aware of the role of physical activity on the ageing process and the consequences of not remaining mobile:

"I will. I hate not to be able to, I'd hate to lose my mobility. I find it really, not just because I like to exercise so to speak; I'd hate not to be able to walk and not be to able to go out on the hills and things like that"

(12m, 14; 383-385)

4. Overall Intervention Perceptions

Louise was supportive of the project and stated that she would participate in the WTB again. She valued the information provided during health assessments, especially for her husband:

"Well yes. I think especially as you get older it's quite useful to know what's happening to you and my husband especially, I think it's very good for him, because he's overweight and he's trying to lose weight and finding it really difficult. But he is gradually knocking it off"

(12m, 11; 275-278)

When asked whether this type of project was a positive or negative way to spend public money, Louise stated:

"Yes, absolutely. It could be cheap at the price, couldn't it really, if it's effective. It also values people I think, doing it this way, because, you know, you hear all around people just accept "crap" passed out to them by doctors and I doing it this way, people are actually respected and, you know, valued as people. Well, I imagine they are, if it was done like that across the board and that in itself is a way of encouraging people to, you know, to do… If you can get hold of them, you know, if you can get to them"

(6m, 17; 521-527)

1.8 Summary: Louise

To summarise, Louise received the Gold award which meant that she had attended her baseline and three-month health assessment, made improvements in three or more health measures, and submitted a pedometer report card. Over the intervention period (baseline to three-months) Louise made improvements to objective measures of health status, waist-hip ratio and waist circumference. In relation to subjective health status, improvements were made during the three month intervention period in the mental health component score of the SF12v2. Louise's perceived health status according to the EQ-5D was improved during the intervention period and scores in all TPB constructs were maintained (intentions; perceived control; attitude; and subjective norms). Louise

reported being in the ‘maintenance’ stage of the TTM, suggesting that she had been engaging in physical activity behaviours for a period of six-months or more.

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Appendix 21: Walk 2: Beijing to London Registration Card