THE IMPACT OF PARTICIPATING IN AN ACTIVITY PROGRAMME (10,000 STEPS @ WORK LITE PROGRAMME) ON DIETARY CHANGE.

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ABSTRACT

High levels of diet related chronic disease in New Zealand has lead to the development of health promotion programmes. The work place is an important venue to implement health promotion programmes to encourage staff to make healthy lifestyle choices.

The aim of this research is to examine if a physical activity programme may be a 'gateway' to other positive behavioral changes such as healthy eating and/or cutting down smoking. This research introduces a health promotion programme to employees at a call centre. The intervention involved 3 groups: the health promotion group (HPG), which received both the physical activity programme (10,000 steps @ work 'lite' programme) plus nutritional information; the nutritional group (NG), which received only the nutritional information and the control group (CG), which did not take part in the intervention.

The impact of the nutritional seminars with or without the exercise programme was measured by the participants' reported fruit, vegetable, snack consumption and transtheoretical stages of change for exercise, fruit and vegetable intake, healthy snacking and smoking. A questionnaire was used to collect data retrospectively.

The health promotion group (HPG) made positive changes in all behaviours unlike the nutritional group (NG) and the control group (CG). This provides some support for the hypothesis that physical exercise may act as a 'gateway' to other positive behavioural changes.

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Approval for the research has been obtained from the Massey University Ethics Committee.

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ETHICS AND CONFIDENTIALITY

Ethic approval for this study was obtained in November 2005 from the Massey University Ethics Committee.

LIST OF ABBREVIATIONS

BMI Body mass index

CG Control group

HPG Health promotion group

MOH Ministry of Health

NG Nutritional group

SCM Stages of change

T1 Time one (6 months ago)

T2 Time two (Currently)

TTM Transtheoretical Model

USDA United States Department of Agriculture

WHO World Health Organisation

1 INTRODUCTION

Diet is very important in controlling the risk factors for major diseases (WHO, 2003 (a)). Along with the effects of diet the effects of sedentary behavior on health are also considered a major cause of mortality (Mokdad et al., 2004).

Cardiovascular disease is the leading cause of death in New Zealand (WHO, 2002). The contributors to cardiovascular disease are: being overweight (Yusuf et al., 1998), physical inactivity, smoking, high blood pressure, high cholesterol levels (Arroll and Swinburn, 1994), diabetes (Yusuf et al., 1998), high saturated fat intakes and inadequate fruit and vegetable intake (WHO, 2003 (a)).

Cancer is the second leading cause of death in New Zealand, with approximately 17,000 new cases registered each year (MOH, 2006). The main causes of cancer are smoking, an unbalanced diet, body mass, inadequate physical activity, and environmental conditions (AICR, 2007). Smoking is the leading preventable cause of cancer, causing one in four deaths in New Zealand (MOH, 2003), while diet is the second leading preventable cause of cancer accounting for 30 per cent of all cancers in developed countries (WHO, 2003 (b)).

The World Health Organization (1998) regards obesity as a "global epidemic" and estimates it will cost countries between two to seven per cent of the yearly budget for health. Obesity is a major risk factor for cardiovascular disease, hypertension, stroke, type 2 diabetes and some cancers (MOH, 2005 (a)). In New Zealand one in three adults are overweight and a further one in four are obese (MOH, 2008). The World Health Organization (WHO) (2006) states that fundamental contributors to obesity are energy dense foods with high fat and sugar contents. Generally foods not prepared at home are higher in calories, fat and saturated fat (Guthrie et al., 2002). Therefore within the work place; with shift work, short breaks and limited access to catering facilities or food retailers, there are many barriers to healthy eating (Jack et al., 1998).

Physical inactivity, along with energy dense foods, contributes to the rates of obesity (WHO, 2006). In New Zealand at least one in seven adults are sedentary (less than

30 minutes of physical activity per week) (MOH, 2008) and one third of the population is physically inactive during leisure time (Hopkins et al., 1991) placing an importance on work place activity. Work place activity is varied depending on the occupation, desk based jobs are not as active as other occupations (Schofield et al., 2005) and many office workers spend a good percentage of their day sedentary (Millar and Brown, 2004). Addressing work place inactivity is therefore important for impacting future health outcomes (Schofield et al., 2005). Worksite health promotion programmes were first developed in the 1970s with Johnson and Johnson's Live for Life programme and the Campbell Soup Company's Turnaround Health and Fitness programme. Since the 1990s, worksite health promotion programmes have steadily increased as companies recognise the benefits of taking responsibility for their employees' health (Cyr, 2003). Multi-faceted health promotion programmes have shown to be successful in creating positive behavioural changes (Campbell et al., 2002). Behaviours such as smoking have been found to adversely affect other health behaviours such as diet and physical activity (Baer Wilson et al., 2005), while physical activity has been regarded as a possible 'gateway' behaviour to promote positive behavioural changes (Blakely et al., 2004).

1.1 Nutrition and diet

1.1.1 Typical fruit and vegetable intakes of New Zealand adults

The Ministry of Health (2003) recommends people consume at least five servings of fruit and vegetables per day. In spite of widespread promotion of fruit and vegetables the MOH (2008) reported only two out of every three New Zealanders consumed the recommended fruit and vegetables servings per day. Those less likely to meet the recommended three servings of vegetables per day are Pacific and Asian men and women. Maori women are slightly less likely to eat recommended fruit and vegetables per day than all other women and Asian women were slightly less likely to eat the recommended fruit per day (MOH, 2008). In addition to being low in fat, a high intake of fruit and vegetables is thought to displace high fat foods from the diet.

In the MOH National Nutrition Survey, wanting to change fruit consumption was the second most popular type of desired dietary change (Russell et al., 1999). According to the New Zealand Cancer Society report (Sullivan et al., 2004) the largest barrier to

fruit and vegetable consumption is cost and the interventions thought most likely to improve fruit and vegetable consumption were:

- a free cook book about fruit and vegetables
- free or low cost fruit and vegetables at work
- advice by a doctor or free advice from a dietitian
- more fruit and vegetables at the place they buy their lunch (Sullivan et al., 2004).

1.1.2 Snacking

Research has shown fruit is not a preferred snack food by most adults (Cross et al., 1994). A preferred snack food must be convenient (not messy), filling and give a quick energy boost (Jack et al., 1997). Chips and chocolate bars fill the above requirements while fruit did not (Jack et al., 1997). The USDA survey from 1977/78 and 1994/96 demonstrated snacking increased by 77-84 per cent (Zizza et al., 2001) with packaged snacks being more energy dense and nutrient poor than home prepared snacks (Nielsen and Popkin, 2003). The energy contribution provided from salty snacks doubled during this time, while sweetened drinks continued to provide major energy contributions to total calories (Zizza et al., 2001).

1.1.3 Work-place snacking

De Assis et al. (2003) confirmed that in a population of shift workers, the choice of snacks was affected by shifts and by the availability of eating facilities. Snack boxes or vending machines are commonly used in the workplace to provide a quick easy snack. The majority of the snacks sold in vending machines are chips, biscuits, crackers and sweets (Maras, 2001). Depending on the location of the office, vending machines may be the only option for a quick snack. Vending machines increase snack availability and in the U.S. contributed to the increased consumption of away foods (meals not prepared at home) between 1977-78 and 1994-96 from 18 per cent to 32 per cent (Guthrie et al., 2002).

1.1.4 Diet and chronic disease

Diet is a risk factor for cardiovascular disease, obesity, cancer and bone health. Diets high in salt and saturated fats, with lower intakes of potassium, lower calcium, and/or

low magnesium may contribute to hypertension, which is a risk factor for cardiovascular disease (Reusser and McCarron, 1994). Increased blood cholesterol levels are also a risk factor for cardiovascular disease and are associated with diets high in saturated fat intake according to classical studies such as Keys et al. (1965) and Hegsted et al. (1965). Current research to date recommends low fat, low glycemic-index diets such as the Mediterranean diet to reduce the risks of cardiovascular disease. The Mediterranean diet includes plenty of fresh fruit and vegetables, fish and oils, with an emphasis on prepared food not processed (Hooper et al., 2004).

Diets high in fast foods that are cheap and energy dense are adding to the problems of obesity, along with lack of physical activity (WHO, 1998). Energy density and portion size are the two major contributors to an increase of energy intake in daily diets (Kral and Rolls, 2004). In addition, there has been an increase of foods with added fats leading to increased energy density (Kral and Rolls, 2004). Fat is the most energy dense and least satiating of the nutrients. Diets high in saturated fat generally with higher total energy levels are correlated with an increase risk in weight gain (AICR, 2007). In New Zealand diets high in saturated fats are more commonly consumed by younger men, Maori and to a lesser extent younger woman (Swinburn et al., 1998).

Current research concludes diet is a valuable factor in cancer prevention (AICR, 2007). One third of the cancer rates in Western countries are expected to be attributed to diet (WHO, 2003 (b)), especially diets with an imbalance of dietary fats and diets without adequate fruit and vegetable intakes. The antioxidants found in fruit and vegetables are believed to help prevent cancer (Ames et al., 1995).

Diet is also important for affecting bone mass density, along with factors such as genetics and exercise (Joseph, 1997). The amount of saturated, monounsaturated and polyunsaturated fat in a diet can affect bone health. Corwin et al. (2006) demonstrated that saturated fat particularly was negatively correlated with bone mass density, especially in areas vulnerable to fractures. Dietary calcium and vitamin D intake in postmenopausal women is important for bone mass and future risk of fractures (Masse et al., 2004). Fruit and vegetable intake correlated with a beneficial

effect on bone mass in women who are still menstruating by providing important nutrients (MacDonald et al., 2004).

1.2 Physical activity

The current physical activity recommendations for healthy living suggest at least 30 minutes of moderate-intensity (equivalent to brisk walking) physical activity for most if not all days of the week (MOH, 2008).

1.2.1 Activity levels of New Zealand adults

The MOH survey 2006/07 found 51 per cent of New Zealand adults meet the physical activity guidelines for being active for 30 minutes per day for five or more days per week (MOH, 2008). Men are more likely to be physically active than women, while Asian men and women are less likely than others to meet the recommended 30 minutes of physical activity on 5 or more days per week. Parents are an important role model for children and in these surveys inactive parents increased the chances of the children being inactive. The main reason given by twenty eight percent of adults for being less active than at the same time the year before is workload or working longer hours (36%). The other reasons given: general illness/injuries and operations (19%), limited time as a result of having a young family (15%), being too busy or having no time (12%) and being busy with study (8%) (SPARC's Facts 97-01).

1.2.2 Sedentary activity levels of office workers

Workers with desk jobs sit for longer periods of time and are less physically active compared to with those who spent less than half their work time sitting (Millar and Brown, 2004). A study of 1579 full time employed men and women correlated men with a body mass index (BMI) of ≥ 25 with sitting times of > than 6 hours per day. In this study conducted by Mummery et al. (2005) the correlation of BMI and sitting time was not shown for women, however, a prospective cohort study conducted by Hu et al. (2003) of 50277 women, suggested that a sedentary workplace environment is a risk factor for becoming overweight or obese. Miller and Brown (2004) compared sitting time with the number of steps taken each day. Participants in this study who spent the most time sitting were also the most inactive.

Many offices are situated in the heart of cities or industrial areas, where the physical environment is not conducive for walking. Parks, footpaths and safe places to walk or run are very important for participation of office workers in physical activity (Duncan and Mummery, 2005). King et al. (2006) suggested a possible relationship between the physical environment such as walk-ability and aesthetic of the area with the likelihood of meeting the national recommendations for physical activity.

1.2.3 Physical activity and chronic disease

Physical activity is associated with chronic disease, including cardiovascular disease, cancer, obesity and bone health. Studies confirm that physical exercise is independent of other factors in the risk of cardiovascular disease (Farrell et al., 1998). Sedentary behaviour is regarded as high a health risk factor as smoking, high cholesterol and high blood pressure (Blair et al., 1996). Those men and women who are moderately to very active, have lower mortality rates for cardiovascular disease than those men and women who have low activity levels (Blair, et al., 1995, Blair et al., 1996, Erikssen et al., 1998).

Physical activity is important for lowering the risk of developing cancer. A large cohort study of Japanese men and women showed significantly decreased risk of colon cancer with increased physical activity among the men (Samad et al., 2005, Lee et al., 2007). AICR (2007) judged there is convincing evidence for physical exercise decreasing the risk of colon cancer, while regular vigorous physical activity is thought have an effect on slowing the process on prostate cancer (Giovannucci et al., 2005). In addition physical exercise is likely to decrease the risk of breast (postmenopause) and endometrium cancer (AICR, 2007). Breast cancer survivors who included physical activity along with a diet high in fruit and vegetables, proved to have more positive outcomes regardless of whether they were obese or non-obese (Pierce et al., 2007).

Obesity occurs when energy intake is greater than energy expenditure (Mummery et al., 2005). Weight gain occurs after a period of time when energy consumed is higher than energy expended (Weinsier et al., 1998). In recent years energy expenditure has decreased with changing work and home environments (Bouchard

and Blair, 1999) and studies have shown reduced physical activity is directly linked to increased risk of obesity (Yang et al., 2007).

Walking for exercise is regarded as important for bone health and reducing fractures such as hip fractures (Cummings et al., 1995). Korpelainen et al. (2006) suggested lifelong physical activity of women with low BMI decreased the risk of falls and fractures.

1.3 Smoking

1.3.1 Smoking in New Zealand

Smoking in New Zealand is a major cause of mortality for middle aged, older people and children as well as being the major cause of illness and suffering in all age groups (MOH, 2004 (c)). The major types of disease caused by smoking are cancer of the respiratory and circulatory systems (McGhee et al., 2006). The Ministry of Health reported that 20 per cent of adult (aged 15 years or older) New Zealanders are smokers and twenty six percent of these smokers are between the ages of 15 and 19 (MOH, 2008). Although the number of people smoking has continued to decrease, 42 per cent of the Maori population and 27 per cent of the Pacific Island population continue to smoke (MOH, 2008). Smoking may be regarded as a 'gateway' behaviour due to its negative impact on both nutrition (Baer Wilson and Nietert, 2002) and physical activity (Kvaavik et al., 2004).

1.3.2 Work stress and barriers to stopping smoking

The Ministry of Health's labour force smoking figures (Table 1) show approximately twenty percent of white collared females and nineteen percent of white collared males smoke. As a labour force group these figures are lower than other working groups. However, some work environments such as call centre environments are regarded as stressful environments (Grandey et al., 2004). Increased work stress is correlated with both the likelihood of smoking and increased smoking intensity (Kouvonen et al., 2006). Stress levels are considered as one of the barriers to stopping smoking (McMahon and Jason, 1998) and for some smokers who quit weight gain occurs, which is also considered a barrier to stopping (Klesges et al., 1997).

Table 1: Labour force status, household income and region**.** Prevalence of cigarette smoking (%). 15+ years, by labour force status and gender (ACNielsen (NZ) Ltd, 2004 in MOH 2005 (b))

	Males	Females
White collar	18.9 (17.4-20.5)	20.2 (19.0-21.4)
Blue collar	32.9 (30.9-34.9)	33 (30.6-35.4)
Home maker	36.8 (25.7-47.8)	22.9 (20.6-25.3)
Student	18.1 (15.0-21.2)	16 (13.4-18.5)
Beneficiary	46.3 (41.9-50.6)	47 (43.6-50.3)

95% confidence intervals are given in parentheses

1.3.3 Smoking and physical activity

Participation in physical activity helps reduce morbidity and mortality from a number of causes, therefore the use of physical activity in reducing the harm caused by smoking is becoming more apparent (deRuiter and Faulkner, 2006). Not only does physical exercise help reduce morbidity and mortality, past studies have correlated physical activity to decreased smoking levels (Emmons et al., 1994). The difficulty remains in increasing the physical activity of smokers. Several studies have found smokers have lower levels of physical activity than non-smokers (Kvaavik et al., 2004; Chiolero et al., 2006).

1.3.4 Smoking and nutrition

Smoking appears to have important effects on nutritional intake. Baer Wilson and Nietert (2002) surveyed a large group of female teens on the relationship between smoking and diet. The survey revealed a correlation between smoking and decreased milk, fruit and vegetable intakes. A Canadian study also revealed smokers' diets were less healthy than non-smokers, with a lower fruit and vegetable intake and a higher saturated fat intake (Palaniappan et al., 2001).

1.3.5 Smoking and chronic disease

The cessation of smoking is related to the decreased risk of cardiovascular disease (Bakhru and Erlinger, 2005; Bernaards et al., 2005) and improved bone health (Korpelainen et al., 2006).

Cardiovascular disease risk is increased in individuals with a body mass index higher than normal and who smoke (Akbartabartoori et al., 2006). In addition Eliasson et al. (2006) found smoking is associated with not only BMI, but also high cholesterol levels.

Smoking along with caffeine and alcohol is regarded as a risk factor for bone health (Korpelainen et al., 2006). Smoking also limits weight increase (Cummings et al., 1995) and low body mass is associated with an increase risk of falls and fractures (Vanitallie, 2003).

1.4 Behavioural change the Transtheoretical Model

The health of the New Zealand population would be improved with a change in diet and increased physical activity. However, behavioural changes in diet and health are difficult to achieve and maintain therefore the use of models such as the Transtheoretical Model (TTM) can be used to focus and assess behavioural change (Lach et al., 2004).

1.4.1 Constructs of the Transtheoretical Model

The TTM was first developed by Prochaska and DiClemente (1983) as a model of change for smoking cessation. The key element of the TTM is that in order to make a behavioural change individuals pass through five stages of change via ten different processes over time. The stages of change model (SCM) depict the stage of behavioural change while the transitions between the stages are affected by the different processes of change at different stages (Prochaska et al., 1992). Each stage is then predicted by psychosocial factors of decisional balance (Janis and Mann, 1977) and self-efficacy (Bandura, 1977).

Positive behavioural changes that have taken place during health promotion interventions may be measured by the TTM. Once the participants' stages of change are identified further interventions may help positive behavioural changes (Lach et al., 2004).

1.4.1.1 Stages of change

The five stages of change distinguished by the TTM are precontemplation, contemplation, preparation, action, maintenance. The stage assigned depends on the intentions and behaviour of the individual (Prochaska & DiClemente, 1983; Prochaska et al., 1992, Prochaska and Velicer, 1997).

1. Precontemplation indicates an individual has no intention of changing their behaviour due to being unaware or in denial that a change is necessary. Precontemplation is generally associated with a lack of information and/or barriers to making a change.

2. Contemplation indicates an individual is thinking about changing the behaviour in the next 6 months; however the individual is not ready to make a change. Contemplators are not ready for action based programmes (Lach et al., 2004).

3. Preparation is when a decision has been made that a change is necessary, but no action has occurred. In this stage the benefits of changing the behaviour are more important than the arguments against changing. Therefore action based programmes are important for individuals in preparation.

4. Action is those individuals who are changing their behaviour in the last six months.
5. Maintenance is defined after 6 months of practicing a behaviour change. This is a time of sustaining a behavioural change and may be a more stable stage.

1.4.1.2 Processes of change

The ten processes of change (Table 2) are common cognitive-affective and behavioral techniques that help people change their behavior (Prochaska & DiClemente, 1979). Help strategies can assist people at different levels of readiness to make behavior changes (Lach et al., 2004). The cognitive-affective processes are those processes that suggest an awareness of certain advantages, for instance eating fruit and vegetables and healthy snacks for a healthier lifestyle. Cognitive-affective processes includes consciousness-raising, dramatic relief, self-reevaluation, social

liberation and environmental re-evaluation. The behavioral processes include counter-conditioning, helping relationships; reinforcement management, self-liberation and stimulus control.

Table 2: The processes of change (Horwath, 1999)

Process	**Definition and Intervention Strategies**
Cognitive-Affective	
Consciousness Raising	Increasing understanding and awareness of self and problem behaviour (observations, bibliotherapy) (gathering information (Rosen, 2000))
Dramatic Relief	Experiencing and expressing strong emotional reaction to events occurring in the environment; involves catharsis (psychodrama, role-playing)
Self Re-evaluation	Appraising the pros and cons associated with changing the problem behaviour (clarify values, imagery, imagine how overcoming problem will feel)
Environmental Re-evaluation	Appraising how one's problem behaviour affects other people or the environment in general (empathy training)
Social liberation	Is concerned with changes in the environment that provide the individual with alternatives (policy intervention)
Behavioural	
Self-liberation	Choosing and committing to act, believing in ability to change (decision-making therapy)
Counter-conditioning	Substituting alternatives for problem behaviour (relaxation, desensitization, assertion)
Stimulus control	Removal of cues or avoidance of situations which trigger the behaviour, restructuring one's environment to add stimuli for alternative behaviours
Helping relationships	Trusting others, and accepting and utilizing their support to change (social support, self-help groups)
Reinforcement management	Rewarding oneself or being rewarded by others for making changes (contracts, overt and covert reinforcements)

Individuals in the precontemplation stage use the least processes of change, while contemplators are most likely to use consciousness raising process. Self-evaluation is present in both contemplators and the action stage, while self-liberation, helping relationship and reinforcement management are all processes of the action stage.

Counter-conditioning and stimulus control bridge both action and maintenance (Prochaska and DiClemente, 1984).

1.4.1.3 Decisional balance

Decisional balance constitutes the importance of pros (benefits) and cons (barriers) for making a decision to change behaviour (Janis and Mann, 1977). Cons are more important than pros in the precontemplation stage, pros are more important in contemplation or preparation stage, while pros need to outweigh cons to move into an action stage (Prochaska et al., 1994). Campbell et al. (1998) related cons or barriers to change more in precontemplators than those contemplating or planning change. Ling & Horwath (2001), however surveyed decisional balance for increasing fruit and vegetable consumption and found cons through the stages stayed relatively constant, while the pro ratings became increasingly positive through the stages.

1.4.1.4 Self-efficacy

Self-efficacy is the confidence or belief that an individual is capable of or successful in producing an intended result. The greater the self-efficacy the more likely an individual will repeat the action. De Vries et al. (1998) correlated the movement through the stages of change with an increase in self-efficacy. For all stage groups, self-efficacy is helpful to prevent a relapse in behaviour or to progress on to the next stage of change (Plotnikoff et al., 2001). King et al. (1996) demonstrated that participants with a high degree of a self-efficacy to change physical activity behaviours also reflected higher levels of self-efficacy towards changing smoking behaviours (King et al., 1996).

1.4.2 Applying the Transtheoretical Model to:

The TTM has been applied to a number of health behaviour changes to predict and focus on behaviour change and evaluate programmes.

1.4.2.1 Physical activity

The TTM has been used to focus programs promoting physical activity. Proper et al. (2003) studied the impact of one-on-one counseling on 299 employees from three

work sites over nine months. This study looked to improve participants' physical fitness and health using the PACE program (Patient-centered Assessment and Counseling for Exercise and Nutrition) and the TTM. The employees involved worked in an office environment and the individualized counseling was based on the concept of stages of behavior. The PACE program focuses on the need for different types of interventions dependent upon the stage of change in which the employee resided. The results showed a positive effect of one-on-one counseling on physical activity, cardio respiratory fitness, percentage of body fat, and blood cholesterol.

Lechner and De Vries (1995) involved 488 employees over two worksites in a study of the determinants of participation in a fitness program. Self-efficacy and attitude were important factors in predicting participation in the programme. Individuals who were in precontemplation and contemplation individuals were targeted for promotional activities and given more information about programme advantages and feasibility. Individuals who were in the action stage required social support, with management and supervisors backing the benefits of the fitness programmes.

1.4.2.2 Nutrition

The TTM has been used to focus and assess the impact of nutrition promotion. De Oliveira et al. (2005) found higher use of cognitive and behavioural processes in participants in preparation, action and maintenance stages compared to precontemplation and contemplation stages. These, however are not consistent with other behavioural changes and recommend cognitive messages should be given throughout programmes through each stage of change. Interventions at all stages increase the awareness of the benefits of fruit and vegetables and increase the awareness of opportunities to eat fruit and vegetables.

1.4.2.3 Smoking

The TTM was originally developed to understand the process of stopping smoking. While a person may not stop smoking in response to an intervention they may be moving through the stages of change and hence are closer to stopping smoking. Lippke et al. (2005) found self-efficacy lowest in the precontemplation stage and highest in action stage. If precontemplators moved stages, perception of health risks

played a major role, however for the contemplators the health risk perception was no longer important for them to make a change and planning to make a change becomes important (Lippke et al., 2005). Precontemplators therefore may possibly lack information on the health risk and are therefore not motivated to make a change in behaviour.

1.5 The impact of health promotion programmes

Health promotion can be defined as "the policies and processes that enable people to increase control over and improve their health. These address the needs of the population as a whole in the context of their daily lives, rather than focusing on people at risk for specific diseases" (A Dictionary of Public Health in Medicine, 2007). The workplace is one setting for health promotion where employers can work with employees to help promote good health. Employers have found that the initial investment of staff, time and finance into health promotion programmes can be offset by financial savings and increasing employee health (Koffman et al., 2005). Stein et al. (2002) associated employee participation in health promotion programmes with improving health and reducing absenteeism. The benefits from health promotion programmes are not only substantial for the participants, but also may have a direct affect on family and the community (O'Donnell, 2002). Any benefits that are gained through workplace health promotion for the individual and the community will lead to benefits on government health expenditure. Deceasing health expenditure in New Zealand is vital as it is increasing exponentially (MOH, 2001).

Health promotion programmes that solely provide physical activity interventions have proved successful in improving physical activity. Pohjonen and Ranta (2001) conducted a study where 50 female homecare workers took part in an exercise intervention programme that increased physical fitness as well as perceived physical fitness. The long term intervention was found to increase physical fitness and improved work ability in a physical job. Physical activity programmes that use pedometers are particularly successful in increasing physical activity of sedentary participants (Chan et al., 2004). Araiza et al. (2006) found those involved in a 10,000 steps programme increased physical activity and had a small positive affect on sedentary type 2 diabetic patients over a short term. The Health and Human Performance 10,000 steps @ work 'lite' program is designed specifically for the

work-place to encourage participants to focus on walking at least 10,000 steps per day.

In general, health programmes that involve both physical activity and nutritional information result in positive behavioural changes to those individuals involved (Brug et al., 1996). A tailored health promotion programme for female blue collared workers that included both nutrition and physical activity was found to be successful in creating positive behavioural changes in both diet and physical activity (Campbell et al., 2002). Other health promotion programmes that focused on nutritional and/or physical activity reported participants decreasing fat consumption (Brug et al., 1996) and body mass index (Chan et al., 2004). Short interventions show benefits as well; a one-off physical activity and lifestyle change programme impacted on 2595 Northern Ireland Civil Servants. This brief 45 minute lifestyle and physical activity programme had a beneficial impact on employees by modifying their lifestyles. Sixty four per cent achieved a dietary change, while 62 per cent achieved a physical activity modification (Addley et al., 2001).

1.5.1 Physical activity as a gateway to changing behaviours

Physical activity promotion may be a 'gateway' to changing other behaviours (Blakely et al., 2004). A study of older adults showed an increase in physical activity correlated with an increase in healthy eating behaviours (Tucker and Reicks, 2002). A later study to increase the fruit and vegetable consumption of North Carolina colorectal cancer survivors supported the view that physical activity may act as a 'gateway' to other behavioural changes. Those participants at baseline who were 100 per cent within the guidelines of recommended physical activity showed a greater increase in fruit and vegetable consumption than other groups after the intervention (Reedy et al., 2005). In addition, Elder and Roberts (2007) reviewed studies reporting the effect of physical exercise on body fatness, energy intake and food preferences and reported physical activity was associated with weight loss. However, other research did not find physical activity acted as a 'gateway' to decrease fat intake, but was associated with increased fat intake (Dutton et al., 2008). Wilcox et al. (2000) also found positive dietary changes were associated with a physical activity program, but not with increased physical activity.

A review on the "gate keeping" function of physical activity on smoking, demonstrated the possibility of the affect of physical activity on positive smoking behavioural changes (deRuiter and Faulkner, 2006). Therefore bringing together multi-faceted programmes that include physical activity such as in this study may increase positive behavioural changes for diet and smoking.

This research focuses on a worksite health programme using physical activity as a possible 'gateway' to changing behaviours such as fruit and vegetable intake, snacking and smoking.

2 AIMS AND OBJECTIVES

Aim

To determine if a 10,000 steps programme is an effective 'gateway' for promoting dietary change and changes in smoking habits.

The method is to examine if physical activity promotes behavioural change and/or change as indicated by the transtheoretical model, an indication of 'success' even if people do not actively change their behaviour.

Objectives

a) to measure the change in dietary practices, physical activity and smoking associated with either a nutrition intervention or a nutrition and physical activity intervention
b) to measure movement through the stages of change for dietary practices and assess the relationship with intervention type
c) to relate the changes in stages of change, decisional balance, self-efficacy with dietary practices

3 METHODOLOGY

The Contact Energy call centre is situated in Levin, a small community in the rural Horowhenua District, employing just over 200 staff. Contact Energy ran a health promotion programme for the call centre offering the programme to three of the six teams (Appendix 1). At the time of the health promotion programme there were six customer service representative teams of approximately fifteen to twenty five people per team.

The involvement of the teams in the health promotion program was used as an opportunity to retrospectively examine changes in diet and smoking associated with physical activity.

3.1 Description of the health promotion programme

Contact Energy ran a health promotion programme consisting of a physical activity programme and/or nutrition promotion programme for 12 weeks starting August 2005. The main intervention was the Health and Human Performance 10,000 steps @ work 'lite' programme, which was run for two customer service teams (33 employees). The 10,000 steps programme involved the use of pedometers to measure the number of steps each participant made each day. The participants were grouped into teams that were then entered into a 'virtual' walking race around New Zealand. The participants in the 10,000 steps programme were also presented with a nutritional seminar and weekly emails of food and activity tips sent from the Cancer Society LiveSmart Coach (2004).

A nutrition only programme was offered to an additional customer service team (24 employees) consisting of the nutritional seminar and weekly emails on healthy food choices that were sent out from the Cancer Society. The nutritional seminar focused on sugars, fats (Appendix 3) and recommended daily servings from "Eating for Healthy Adult New Zealanders" brochure (MOH, 2004 (b)), it was not based on the stages of change model.

Weekly morning teas were put on by Contact Energy. These focused on healthy food options, including fruit and were available to all staff working in the Levin call centre.

All the seminars were presented to the groups by the author (Nicola Hartshorn) (Appendix 1, 2 & 3).

3.2 Selection of participants

Three groups of people were invited to be involved in the study:

1. HPG (Health Promotion Group) comprised of participants of the exercise program (10,000 steps) who have also received the nutritional seminar and weekly LiveSmart emails (n=32)
2. NG (Nutritional Group) who only received the nutritional seminar and weekly LiveSmart emails (n=24)
3. CG (Control Group) that did not receive either of the above treatments (n=40)

Members of the teams who participated in the 10,000 steps programme and those who received the nutritional programme only, received a letter plus information sheet requesting their participation at the end of the health promotion programme (Appendix 4, 5, & 6). A letter and information sheet was also given to those in the customer service teams who did not take part in either of the health promotion programmes (Appendix 4 & 7). This latter group of participants who completed the questionnaire was the control group.

This study was approved by Palmerston North human ethics committee (application 05/106). The ethical question raised for this study was recruitment in the workplace and the obligation that participants may have felt.

4 DATA COLLECTION

4.1 Administration of questionnaires

The questionnaire was distributed to every participant in person by the researcher along with an addressed envelope. The questionnaires included a code to identify the group e.g. health promotion group (HPG), nutritional group (NG) and the control group (CG) (Appendix 8 & 9). Completed questionnaires were then put in an addressed envelope and placed in a marked box at Contact Energy to ensure anonymity. A reminder email was sent to all participants one week after the initial distribution of questionnaires.

4.2 Questionnaire development

The questionnaire asked about behaviour, stages of change, decisional balance and self-efficacy. The health promotion programme had already started before the questionnaire was able to be administered, therefore the questionnaire involved a retrospective section, referring to 6 months ago or time one (T1) as well as a current section or time two (T2). The retrospective section referred to the period before the health promotion programme had started.

The questionnaire was developed from a number of different questionnaires. The National Nutrition Survey (Russell et al., 1999) and the Health Survey 2002/2003 (MOH, 2004 (a)) questions were used for snacks and fruit and vegetable consumption. The stages of change questions were developed from Armitage et al. (2004) and De Oliveira et al. (2005). The barriers and benefits questions are developed from Ling and Horwath (2001), Satia et al. (2002) and the National Nutritional Survey (Russell et al., 1999). The efficacy questions were developed from Gulliver and Horwath (2001 (a)). The questionnaire was pre-tested on a small group of voluntary Contact Energy staff to check for understanding and ease of answering the questions. No major changes were required after the pre-testing.

Section 1 consists of questions 1-14, which are retrospective e.g. “Thinking back 6 months ago…”. The use of retrospective questions is used as a comparison, due to the programme starting before the questionnaire was issued. Section 2 comprises of current questions 15-42 “Thinking about the present…”.

Questions 1-2 and 15-16 were developed from the NRB Healthy Survey (MOH, 2003).

A group of questions (4, 7, 9, 11, 13, 18, 23, 28, 33, 38) are intended to assess the stages of change based on the Prochaska and Di Clemente's (1983) TTM of behavioural change. There are 5 stages in the SCM (Prochaska et al., 1992): *precontemplation*, "not thinking about…"; *contemplation*, "thinking about starting…"; *preparation*, "about to start…"; *action*, "had started…"; and *maintenance*, "I was already…" (Do Carmo et al., 2005). These questions queried what stage of change each participant perceived them selves to be in at both T1 and T2.

Questions related to food consumption, questions 5 & 20 were adapted from the MOH 1997 survey (Russell et al., 1999) using a food frequency scale from "never" to "2 or more times a day" (Holbert and Speece, 1993). These questions give an indication of the types of snacks being consumed by the participants and how regularly these snacks were being consumed.

Questions 8, 10, 27, 32 are original questions from the MOH survey (Russell et al., 1999) to record the amount of fruit and vegetable consumption for the participants.

Open ended questions 6 and 21 collect information of other snacks that participants eat regularly and question 22 was inserted to give an indication of what each participant regarded as a healthy snack.

Questions 25, 30 and 35 were developed using a Likert scale from "strongly agree" to "strongly disagree" (Holbert and Speece, 1993). These questions dealt with the understanding the participants' decisional balance, the pros and cons to changing behaviour.

Questions 26, 31 and 36 queried the participant's self-efficacy to make a change using a Likert scale from "strongly agree" to "strongly disagree. These questions relate to the confidence each individual has in consuming healthy snacks, fruit and vegetables in different situations.

Question 19, 24, 29, 34 and 39, “If you made a change in your…what change have you made and why have you made this change?” This question was developed to give an indication why each participant made a change of behaviour in their own words.

Questions 14 and 40 ask about each participant’s general health, giving the idea of how each participant regarded their health in the 6 months before and after the health promotion programme. Demographics of gender and age are asked in questions 41 and 42.

The questionnaire was slightly modified for the groups that had not participated in 10,000 steps and nutrition seminar. The only difference between the HPG questionnaire and the NG and CG questionnaires is the addition of the number of daily steps question 3 and 17 in the HPG questionnaire.

5 DATA ANALYSIS

5.1 Data handling

Data from the questionnaires was entered into an excel spreadsheet with random checks for accuracy. The pros/cons and efficacy data were summed and categorized in three categories. To facilitate data analysis a number of the variables were collapsed into three categories, e.g. number of serves of fruit per day. Table 3 indicates which variables were collapsed into fewer categories as well as subsequent data analysis.

Table 3: Data Analysis and Management

Questions*	Data	Comparison	Data Analysis
Q39 & Q40 demographics	Uncollapsed	Between the groups	Table 4 Fisher's Exact Test
Q1 perceived fitness T1	Uncollapsed	Q14 T2	Table 5 Fisher's Exact Test
Q2 physical activity T1	Uncollapsed	Q15 T2	Table 6
Q13 perceived health T1	Uncollapsed	Q38 T2	Table 7 Fisher's Exact Test
Q3 Stages of change for PA T1	Uncollapsed	Q16 T2	Figure 1 Fisher's Exact Test
Q7 servings fruit per day T1	Collapsed $_1$	$Q25_1$ T2	Table 8 Fisher's Exact Test
Q8 stage of change 2 plus serving fruit T1	$Uncollapsed_6$	$Q26_6$ T2	Figure 3 Fisher's Exact Test
Q28 pros eating fruit	$Collasped_3$		Fisher's Exact Test Table 9
Q28 cons eating fruit	$Collasped_3$		Fisher's Exact Test Table 10
Q28 pros eating fruit	Collapsed $_3$ Categorised $_4$		Fisher's Exact Test Table 11
Q28 pros/cons eating fruit and Q25 serves fruit	Collapsed $_3$ Categorised $_5$	$Q25_1$	Fisher's Exact Test Table 12
Q28 pros/cons eating fruit and Q26 stages of change for fruit	Collapsed $_3$ $Categorised_4$	$Q26_6$	Fisher's Exact Test Figure 5
Q29 efficacy eating fruit	Collapsed $_3$		Fisher's Exact Test Table 13
Q29 efficacy eating fruit	Collapsed $_3$ Categorised $_7$	$Q26_6$	Fisher's Exact Test Figure 6
Q9 servings vegetables per day T1	Collapsed $_2$	$Q30_2$	Fisher's Exact Test Table 14
Q10 stage of change 3 plus serving veg T2	$Uncollapsed_6$	$Q31_6$	Fisher's Exact Test Figure 7
Q33 pros eating vegetables	Collapsed $_3$		Fisher's Exact Test Table 15

Q33 cons eating vegetables	Collapsed [3]		Fisher's Exact Test Table 16
Q33 pros/cons eating vegetables	Collapsed [3] Categorised[8]		Fisher's Exact Test Table 17
Q33 pros/cons eating vegetables and Q31 stages of change vegetables	Collapsed[3] Categorised[8]	Q31[6]	Figure 8
Q34 efficacy eating vegetables	Collapsed [3]		Fisher's Exact Test Table 18
Q34 efficacy eating vegetables	Collapsed [3] Categorised [9]		Fisher's Exact Test Table 19
Q34 efficacy eating vegetables and Q30 servings vegetables	Collapsed [3] Categorised [9]	Q34 & 30[3]	Fisher's Exact Test Table 20 & Table 21
Q34 efficacy eating vegetables and Q31 stages change vegetables	Collapsed[3] Categorised[9]	Q31[6]	Figure 9
Q4 snacking[12]	High fat/high sugar[10***] Low fat/low sugar[11***]	Q18[12]	Fisher's Exact Test Table 22 & Table 23
Q6 stages of change snacking	Uncollapsed[6]	Q26[6]	Fisher's Exact Test Figure 10
Q23 pros snacking	Collasped[3]		Fisher's Exact Test Table 24
Q23 cons snacking	Collasped[3]		Fisher's Exact Test Table 25
Q23 pros/cons snacking	Collapsed[3] Categorised[13]		Fisher's Exact Test Table 26
Q23 pros/cons snacking and Q18 snacking	Collapsed[3] Categorised[13]	Q18[12]	Fisher's Exact Test
Q23 pros/cons and Q21 stages of change	Collapsed[3] Categorised[13]	Q21[6]	Fisher's Exact Test Figure 14
Q24	Collapsed[3]		Fisher's Exact Test Table 27
Q24	Collapsed[3] Categorised[14]		Fisher's Exact Test Table 28
Q24 Self-efficacy of snacking and Q18 stages of change snacking	Collapsed[3] Categorised[14]	Q18[6]	Fisher's Exact Test
Q12 & Q36 Stages of change smoking	Uncollapsed[6]	Q36[6]	Fisher's Exact Test Figure 15

* *Question numbers based on Questionnaires for NG & CG*

1 (1) I don't eat fruit, less than 1 serving per day and 1 serving per day (2) 2 servings per day (3) 3 servings or more per day.

2 (1) I don't eat vegetables or less than 1 serving per day, (2) 1 serving per day or 2 servings per day (3) 3 servings per day or 4 servings per day.

3 (1) strongly agree and agree (2) neither agree nor disagree and (3) disagree and strongly disagree.

4 The scores for the pros for fruit intake were summed and categorized into three categories: (1) 10 to 15 (2)16 to 20 (3) 21 to 30.

5 The scores for both the pros and cons (reversed*) for fruit intake were summed and categorized into three categories: 1 (18-22) 2 (23-26) 3 (27-54). The categories for the pros and cons 1, 2 and 3 were

calculated using quantiles. Category 1 consisted of high pros/low cons and category 3 consists of low pros/high cons.

6 Stages of change for fruit (1) precontemplation (2) contemplation (3) preparation (4) action (5) maintenance (uncollapsed data).

7 The scores for self-efficacy for fruit were summed and categorized into three categories: (1) 9 (2) 10-12 and (3) 13-27. The categories for self-efficacy 1, 2 and 3 were calculated using quantiles. Category 1 consisted of high self-efficacy and category 3 consists of low self-efficacy.

8 The scores for both the pros and cons (reversed*) for vegetables were summed and categorized into three categories: (1) 18-22, (2) 23-27 and (3) 28-54. The categories for the pros and cons 1, 2 and 3 were calculated using quantiles. Category 1 consisted of high pros/low cons and category 3 consists of low pros/high cons.

9 The scores for self-efficacy for vegetables were summed and categorized into three categories: (1) 8, (2) 9-11 and (3) 12-24. The categories for self-efficacy 1, 2 and 3 were calculated using quantiles. Category 1 consisted of high self-efficacy and category 3 consists of low self-efficacy.

10 Chippies, biscuits/cake, muffins/scones, sweets/chocolate and pies.

11 Sandwiches, carrot sticks, muesli bars and fruit.

12 (1) never (2) less than once a month (3) 1-3 times per month (4) Once a week (5) 2-4 times per week (6) 5-6 times per week, (7) once per day and (8) 2 or more times per day collapsed to (1) never or less than once per month, (2) 1-4 times per month (3) 2-6 times per week, (4) once a day or more.

13 The scores for both the pros and cons (reversed*) for snacking were summed and categorized into three categories: (1) 12-15 (2) 16-20 (3) 21-36. The categories for the pros and cons 1, 2 and 3 were calculated using quantiles. Category 1 consisted of high pros/low cons and category 3 consists of low pros/high cons.

14 The scores for self-efficacy for snacking were summed and categorized into three categories: (1) 6 (2) 7 and 3 (8-18). The categories for self-efficacy 1, 2 and 3 were calculated using quantiles. Category 1 consisted of high self-efficacy and category 3 consists of low self-efficacy.

* To calculate the most agreement with pros and less agreement with cons, the cons were reversed e.g. (1) disagree and strongly disagree, (2) neither agree nor disagree and (3) strongly agree and agree. This allowed the overall summed scores to demonstrate the lowest scores being those participants who agreed more with the pros and disagreed more with the cons.

*** Muesli bars can be regarded as high fat/high sugar food or low fat/low sugar food. The inclusion of muesli bars could be regarded as a confounding factor, therefore were excluded from the data analysis.

5.2 Statistical analysis

Statistical analyses were calculated using SAS 9.1 (2002-2003) for Windows (SAS Institute Inc., Cary, NC, USA). All data were analyzed using non-parametric statistical tests as the data did not show normal distributions under the SAS univariate normal test. The Fisher's Exact Test was used, however in order to provide a valid test some of the variable categories were collapsed due to the small sample size (Table 3). In addition the Wilcoxon Rank Sum Test was used for paired, time 1 to time 2 comparisons of uncollapsed data. A p value of < 0.1 was used for statistical significance due to small sample size.

6 RESULTS

6.1 Characteristics of the participants

Three groups of participants were recruited from the Levin Call Centre customer service representatives: the health promotion group (HPG), who had participated in the combined physical activity and nutrition promotion programme (10,000 steps @ work lite, nutritional seminar and LiveSmart tips); the nutritional group (NG), who only participated in the nutritional programme (nutrition seminar and LiveSmart tips) and the control group (CG), who had not directly participated in the health promotion programme. Ninety-six employees were approached to participate, from these 68 participants completed the questionnaire (71%), with the HPG completing the largest number. Twenty four were completed from the HPG (75% response rate), nineteen from the NG (79% response rate) and twenty five from the CG (62% response rate).

The majority of the call centre employees are women and this is reflected in the total sample (91%). The participants were aged between 18 and 65, although in this sample the HPG participants were older with 88 per cent of the participants over 36 years of age compared to 73 per cent in the NG and 64 per cent in the control group. There were no significant age or gender differences between the groups (Table 4).

Table 4: Participant demographics

	Total *(n=68)*	%	Control *(n=25)* CG	%	Intervention *(n=24)* HPG		Intervention *(n=19)* NG	
Male	6	9%	2	8%	2	8%	2	11%
Female	62	91%	23	92%	22	92%	17	89%
Age between 18-25	6	9%	4	16%	0	-	2	11%
Age between 26-35	11	16%	5	20%	3	13%	3	16%
Age between 36-45	25	37%	10	40%	10	42%	5	26%
Age between 46-55	19	28%	5	20%	9	38%	5	26%
Age between 56-65	7	10%	1	4%	2	8%	4	21%

6.2 Perceived fitness

Overall 64 per cent of the respondents reported themselves to be unfit or moderately unfit before the intervention and 40 per cent after the intervention. Over the time of the intervention, the HPG (P<0.0001) perceived a significant change (increase) in fitness, compared to the CG (P=0.1309) and NG (P=0.4531). The HPG in T1 demonstrated 71 per cent as unfit or moderately unfit compared to T2 with only 25 per cent regarding themselves as unfit or moderately unit. The groups therefore were similar in T1 (P=0.7506) and significantly different in T2 (P=0.0292 Fisher's Exact Test) (Table 5).

Table 5: Perceived fitness at T1 and T2

	Control *(n=25)*		Intervention *(n=24)* HPG		Intervention *(n=19)* NG	
	T1	T2	T1	T2	T1	T2
Perceived Fitness (%)						
Extremely Fit	4.00	8.00	-	-	-	-
Moderately Fit	44.00	56.00	29.00	75.00	32.00	32.00
Moderately Unfit	28.00	20.00	46.00	21.00	37.00	53.00
Unfit	24.00	16.00	25.00	4.00	31.00	15.00
	P=0.1309		P<0.0001		P=0.4531	

Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test

Between group comparisons determined by Fisher's Exact Test T1 (P=0.7506) T2 (P=0.0292)

6.3 Activity levels

On average the respondents were active 3.1 days per week in T1 compared to 4.1 in T2. All groups reported increased activity, as indicated by the number of days per week of 15 minutes or more of vigorous activity or 30 minutes or more of moderate activity. HPG demonstrated a highly significant increase in the number of days exercising from an average of 2.9 days to 4.6 days per week (P<0.0001), while CG increased from 3.10 days to 3.94 (P=0.0430) and NG 3.36 days to 3.88 (P=0.0703) (Table 6). The HPG's increased number of days exercising is additionally supported by a significant increase in the number of daily steps reported from T1 to T2 (P=0.0003).

Table 6: Number of days per week each participant is exercising at T1 and T2

	Control *(n=25)*		Intervention *(n=24)* HPG		Intervention *(n=19)* NG	
	T1	T2	T1	T2	T1	T2
Days per week exercising						
Mean	3.10	3.94	2.86	4.61	3.36	3.88
Std deviation	(1.66)	(1.62)	(1.64)	(1.78)	(1.54)	(1.75)
	P=0.0430		P<0.0001		P=0.0703	

Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test

6.4 Perceived health

Ninety-two per cent of the participants perceived their health to be between fair and excellent. Overall there was no significant differences in perceived health status between the groups at T1 (P=0.3068) (Table 7). There was however a significant improvement in health perception by members of the HPG group (P=0.0039), whereas the other two groups did not show significant improvements. Fifty-nine per cent of the HPG reported excellent, very good or good health before the programme and 88 per cent after the programme. This contrasts to 74 per cent of the NG having excellent, very good or good health at the start of the programme with no change at the end of the programme (Table 7).

Table 7: Perceived health at T1 and T2

	Control *(n=25)*		Intervention *(n=24)* HPG		Intervention *(n=19)* NG	
	T1	T2	T1	T2	T1	T2
Perceived Health (%)						
Excellent	16	8	4	12.5	0	0
Very Good	24	36	17	25	32	42
Good	36	32	38	50	42	32
Fair	12	20	38	12.5	16	16
Poor	12	4	4	0	11	11
	P>=1.0000		P=0.0039		P=0.7539	

Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test

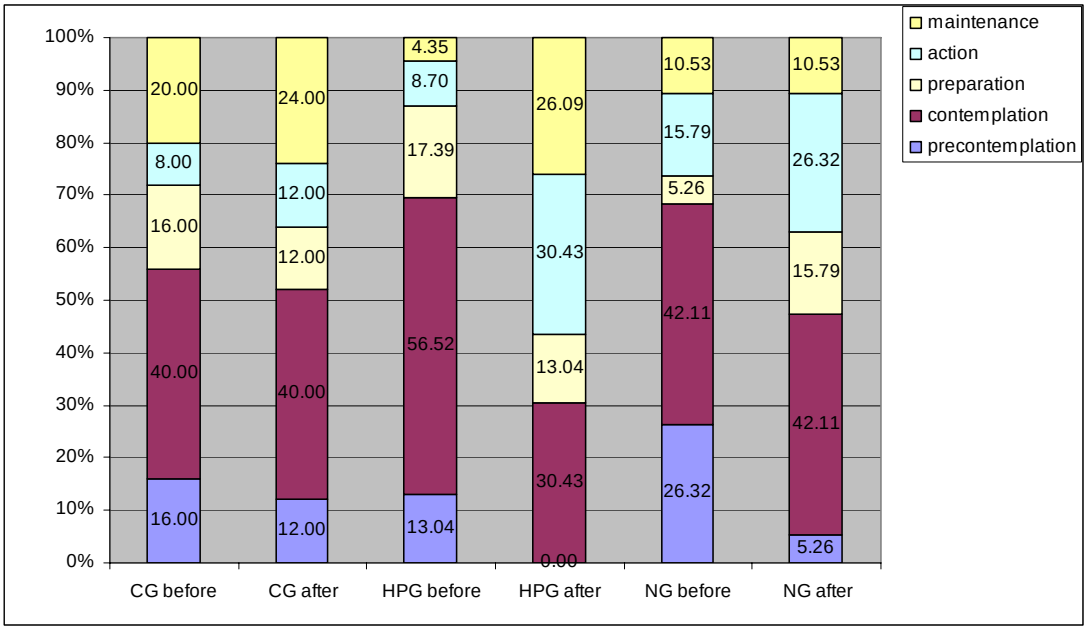
Between group comparisons determined by the Fisher's Exact Test T1 (P=0.3068) and T2 (P=0.4642)

6.5 Physical activity

6.5.1 Stages of change and the participants movements through the stages for physical activity

Respondents were asked about their intention regarding physical activity in relation to their stage of change 6 months ago and currently. Eighteen per cent of the participants in all the groups started in precontemplation and after T2 only 6 per cent remained. Additionally 8 per cent of the participants in all groups started in maintenance and after T2 those in maintenance increased to 20 per cent (Figure 1). The HPG demonstrated a highly significant movement through the stages over time (P=0.0021 Wilcoxon Rank Sum Test), while the other two groups did not (NG P=0.1411, CG P=0.4414). All the precontemplators in the HPG moved on with some moving several stages and 44 per cent of the contemplators reportedly moved to preparation, action and maintenance (Figures 1 and 2). Not all the participants moved through the stages of change in a positive direction though, Figure 2 illustrates that 9 per cent of the HPG moved from preparation to contemplation and 4 per cent moved from action to contemplation.

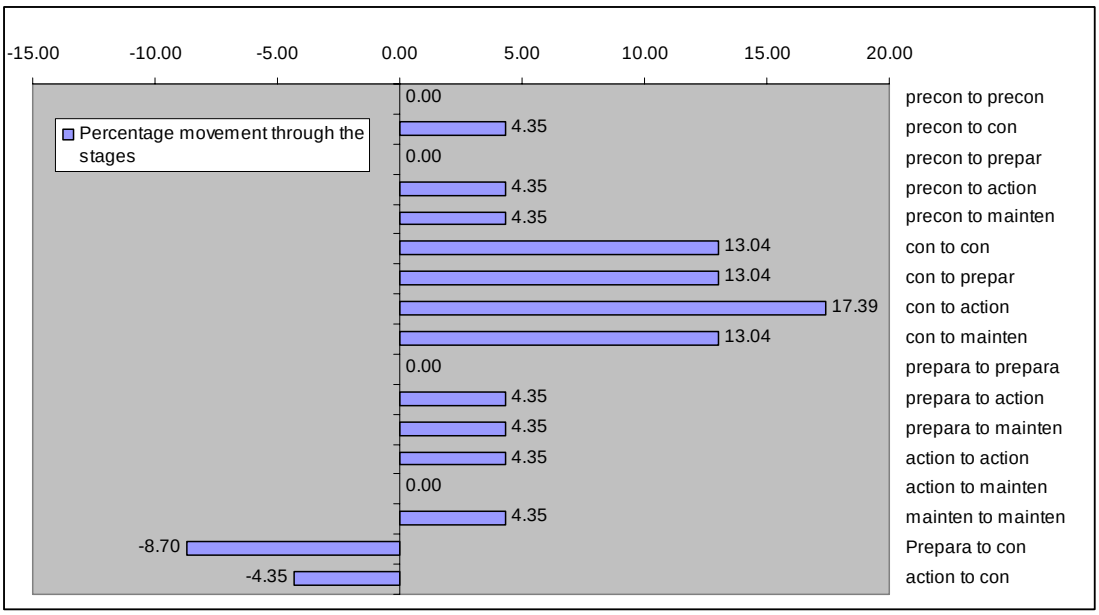
Figure 1: Stages of change percentages on becoming more physically active for all groups in T1 and T2



Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0021) NG (P=0.1411) CG (P=0.4414)

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.6839) and T2 (P=0.5640)

Figure 2: HPG percentage movement through the stages for becoming more physically active from T1 to T2



Precon-precontemplation, con-contemplation, prepare-preparation, mainten-maintenance

6.6 Fruit intakes

The analysis of fruit intakes demonstrated 66 per cent of the all the respondents consumed 1 serve or less fruit per day at T1 compared to 50 per cent in T2. There were no significant differences between the groups in T1 (P=0.2578), however the HPG demonstrated a significant increase in fruit intake between T1 and T2 (P=0.0165) (Table 8). The NG also demonstrated a percentage of participants increasing their servings of fruit per day from T1 to T2 (P=0.0938), with 47 per cent meeting the recommendation at T2 compared 21 per cent in T1

Table 8: Fruit intake at T1 and T2

	Control *(n=25)* CG		Intervention *(n=24)* HPG		Intervention *(n=19)* NG	
	T1	T2	T1	T2	T1	T2
Fruit consumption (%)						
1 serve/day or less	60.00	48.00	58.33	50.00	78.95	52.63
2 serves/day	32.00	36.00	25.00	12.50	5.26	21.05
3-4 serves/day	8.00	16.00	16.67	37.50	15.79	26.32
	P=0.1396		P=0.0165		P=0.0938	

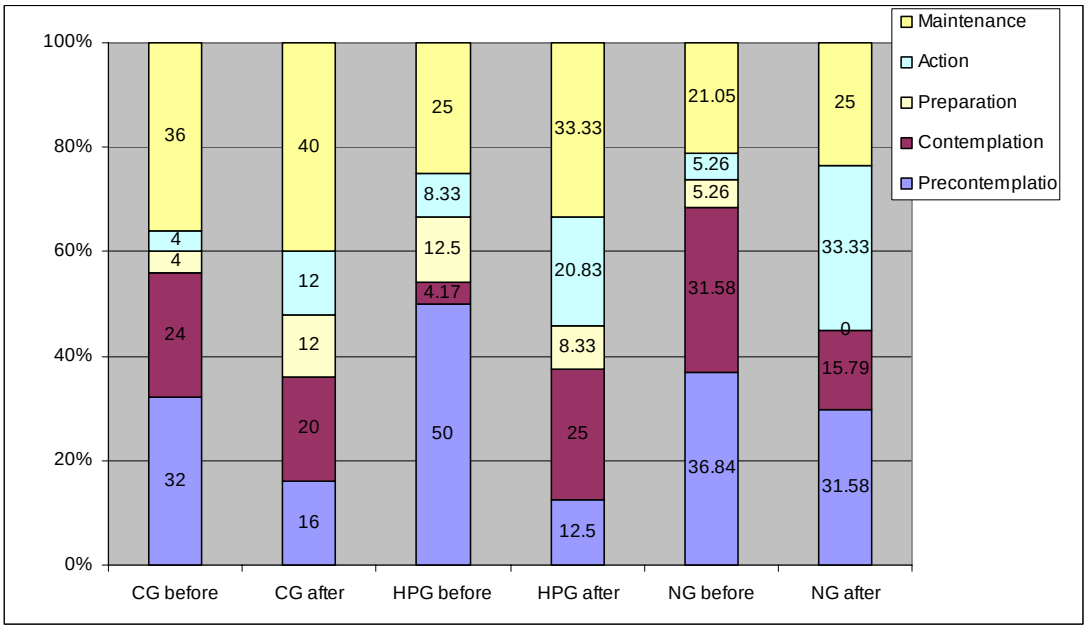
Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.2578) and T2 (P=0.2745)

6.6.1 Stages of change and the groups movements through the stages for fruit intakes (2 servings per day)

Analysis of the stages of change for fruit consumption revealed the HPG (P=0.0490) and the NG (P=0.0781 Wilcoxon Rank Sum Test) demonstrated movement between the stages. The CG (P=0.1113) did not significantly move through the stages. In T1 the HPG showed 50 per cent of its participants in precontemplation and in T2 only 13 per cent remained (Figure 3). Twelve and a half per cent moved equally into the contemplation, action and maintenance. In comparison NG increased participants in the action stage by 28 per cent. Again not all the movement between stages was in a positive direction, participants in the HPG moved backwards across the stages from action to preparation, action to contemplation and maintenance to action (4 % each), and 8 per cent from action to contemplation (Figure 4).

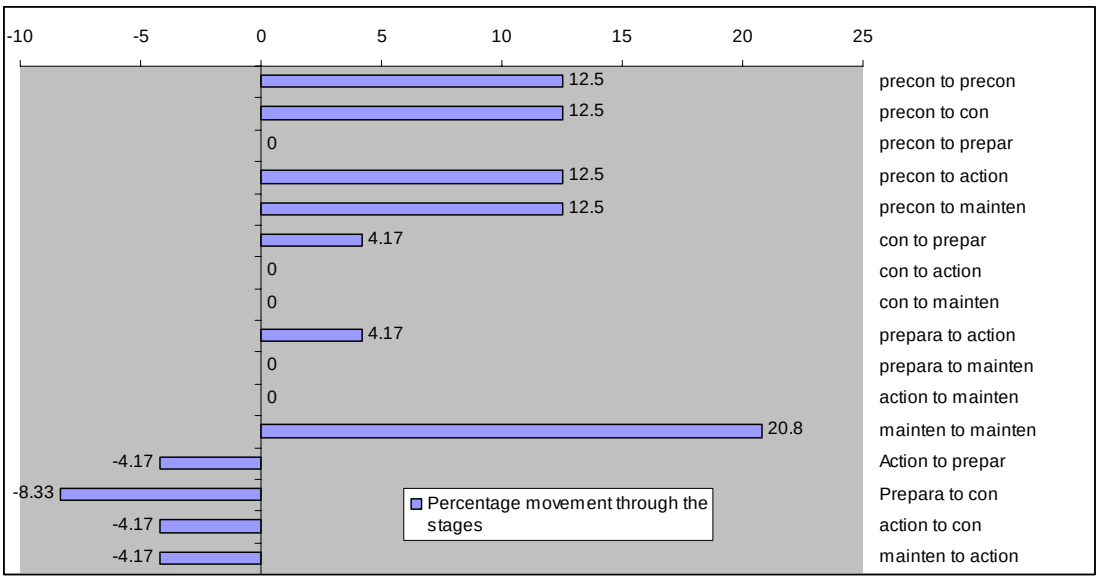
Figure 3: Stages of change percentages on fruit intake (2 servings per day) for all groups in T1 and T2



Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0490) (NG P=0.0781) (CG P=0.1113)

Between group comparisons determined by the Fisher's Exact T1 (P=0.3898) or in T2 (P=0.6698)

Figure 4: HPG percentage movement through the stages for eating 2 servings of fruit from T1 to T2



Precon-Precontemplation, Con-Contemplation, Prepar-Preparation, Mainten-Maintenance

6.6.2 The decisional balance for eating fruit

The majority of the participants agreed with most of the pros (benefits) of eating fruit, with over 75 per cent agreeing with 6 of the 10 pros. The agreement to the pros of eating fruit was the same between the groups for most statements. There were however, significant differences between the groups for two statements: the first, *"I would feel good about looking after my health by eating 2 + servings of fruit per day"* (P=0.0038), the HPG demonstrated a 100 per cent agreement with this statement, compared to the NG, which only demonstrated a 63 per cent agreement. The second statement demonstrating a significant difference between the groups was "*Fruit is important in relation to enjoying physical exercise"* (P=0.0236). The HPG showed no disagreement with this question compared to the other two groups (Table 9). There were no significant differences between the groups in regards to the cons (barriers) statements except a trend of difference with "*Ordering fruit when I eat out doesn't give me value for money*" (P=0.0942) and *"I don't like the taste and/or texture of most fruit"* (P=0.0795) (Table 10).

Table 9: Agreement or disagreement with the pros of eating fruit (2 servings per day), comparison between the groups

Total (*n=68/68*)	Total Sample	Control (*n=25/25*) CG	Intervention (*n=24/24*) HPG	Intervention (*n=19/19*) NG	
Fruit is cheap to buy					
Agree	41.18	28.00	41.67	57.89	
Neither agree nor disagree	22.06	36.00	20.83	5.26	
Disagree	36.76	36.00	37.50	36.84	(P=0.1320)
Eating 2+ servings of fruit per day would give me plenty of vitamins and minerals					
Agree	82.35	84.00	75.00	89.47	
Neither agree nor disagree	13.24	12.00	20.83	5.26	
Disagree	4.41	4.00	4.17	5.26	(P=0.6910)
Eating fruit would help me "cleanse" my body					
Agree	79.41	84.00	79.17	73.84	
Neither agree nor disagree	17.65	16.00	16.67	21.05	
Disagree	2.94	0.00	4.17	5.26	(P=0.8371)
(n=67/68)		(n=25/25) CG	(n=24/24) HPG	(n=18/19) NG	
Eating fruit is a good way to cut down calories					
Agree	79.10	76.00	79.17	83.33	
Neither agree nor disagree	13.43	20.00	16.67	0.00	
Disagree	7.46	4.00	4.17	16.67	(P=0.1527)
I would feel good about looking after my health by eating 2 + servings of fruit per day					
Agree	83.82	84.00	100.00	63.16	
Neither agree nor disagree	13.24	16.00	0.00	26.32	
Disagree	2.94	0.00	0.00	10.53	(P=0.0038)
(n=67/68)		(n=25/25) CG	(n=23/24) HPG	(n=19/19) NG	
I enjoy the taste of most fruit					
Agree	86.57	92.00	91.30	73.68	
Neither agree nor disagree	5.97	4.00	4.35	10.53	
Disagree	7.46	4.00	4.35	15.79	(P=0.4621)
(n=68/68)		(n=25/25) CG	(n=24/24) HPG	(n=19/19) NG	
Eating 2 + servings of fruit per day would mean that I'm less likely to get cancer					
Agree	38.24	32.00	41.67	42.11	
Neither agree nor disagree	48.53	48.00	54.17	42.11	
Disagree	13.24	20.00	4.17	15.79	(P=0.5200)
People who eat plenty of fruit look healthier					
Agree	45.59	48.00	50.00	36.84	
Neither agree nor disagree	42.65	40.00	45.83	42.11	
Disagree	11.76	12.00	4.17	21.05	(P=0.5738)
Fruit is important in relation to enjoying physical exercise					
Agree	51.47	52.00	58.33	42.11	
Neither agree nor disagree	32.35	32.00	41.67	21.05	
Disagree	16.18	16.00	0.00	36.84	(P=0.0236)

Fruit is a quick and easy snack					
Agree	97.06	96.00	95.83	100.00	
Neither agree nor disagree	2.94	4.00	4.17	0.00	
Disagree	0.00	0.00	0.00	0.00	(P=1.00)
(n=67/68)		(*n=25/25*) CG	(*n=24/24*) HPG	(*n=19/18*) NG	
It's worthwhile spending extra money on fruit					
Agree	67.16	60.00	79.17	61.11	
Neither agree nor disagree	23.88	28.00	16.67	27.78	
Disagree	8.96	12.00	4.17	11.11	(P=0.6152)

Between group comparisons determined by the Fisher's Exact Test

Table 10: Agreement or disagreement with the cons of eating fruit (2 servings per day), comparison between the groups

Total (n=67/68)	Total Sample	Control (*n=25/25*) CG	Intervention (*n=23/24*) HPG	Intervention (*n=19/19*) NG	
I would feel I would be over eating if I ate 2 + servings of fruit per day					
Agree	0.00	0.00	0.00	0.00	
Neither agree nor disagree	10.45	12.00	8.70	10.53	
Disagree	89.55	88.00	91.30	89.47	(P=0.9324)
(n=68/68)		(*n=25/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
Ordering fruit when I eat out doesn't give me value for money					
Agree	33.82	20.00	29.17	57.89	
Neither agree nor disagree	39.71	52.00	37.50	26.32	
Disagree	26.41	28.00	33.33	15.79	(P=0.0942)
I would worry about pesticides if I ate 2 or more pieces of fruit per day					
Agree	4.41	12.00	0.00	0.00	
Neither agree nor disagree	23.53	20.00	33.33	15.79	
Disagree	72.06	68.00	66.67	84.21	(P=0.1209)
(n=66/68)		(*n=25/25*) CG	(*n=22/24*) HPG	(*n=19/19*) NG	
I get a bad reaction if I eat more of certain fruit					
Agree	18.18	20.00	18.18	15.79	
Neither agree nor disagree	12.12	12.00	13.64	10.53	
Disagree	69.70	68.00	68.18	73.68	(P=0.9929)
(n=68/68)		(*n=25/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
I don't like the taste and/or texture of most fruit					
Agree	7.35	4.00	0.00	21.05	
Neither agree nor disagree	11.76	8.00	16.67	10.53	
Disagree	80.88	88.00	83.33	68.42	(P=0.0795)
(n=67/68)		(*n=25/25*) CG	(*n=24/24*) HPG	(*n=18/19*) NG	
Fruit is not sweet enough					
Agree	4.48	4.00	4.17	5.56	
Neither agree nor disagree	16.42	12.00	16.67	22.22	
Disagree	79.10	84.00	79.17	72.22	(P=0.9223)

(n=68/68)		(n=25/25) CG	(n=24/24) HPG	(n=19/19) NG	
Fruit does not store well					
Agree	45.59	40.00	50.00	47.37	
Neither agree nor disagree	26.47	22.00	16.67	31.58	
Disagree	27.94	48.00	33.33	21.05	(P=0.6978)

Between group comparisons determined by the Fisher's Exact Test

There were no significant differences between the groups when the pros and cons for fruit consumption (P=0.6318) when summed and categorised. However a significant difference between the groups occurred when using the sum of all data for the pros only (P=0.0104) (Table 11). No significant differences were demonstrated between the groups for the categorized cons (P=0.5497).

Table 11: Relationship between pros of fruit intake and intervention groups

	Control *(n=25)* CG	Intervention *(n=24)* HPG	Intervention *(n=19)* NG
Sum of Pros *(the lowest score with complete agreement is 10, the highest with complete disagreement 30)*			
Category 1 (10-15)	52.00	66.67	63.16
Category 2 (16-20)	44.00	33.33	10.53
Category 3 (21-30)	4.00	0.00	26.32

Between group comparisons determined by the Fisher's Exact Test (P=0.0104)

6.6.2.1 The relationship between the decisional balance for eating 2 servings of fruit per day and fruit intake

When the summed pros and cons questions were grouped into categories there was a significant relationship with fruit intake (P=0.0182) (Table 12). When analysing the categorized pros and cons separately, no evidence of a relationship with fruit intake was demonstrated.

Table 12: Relationship between fruit intake and decisional balance (sum of pros and cons)

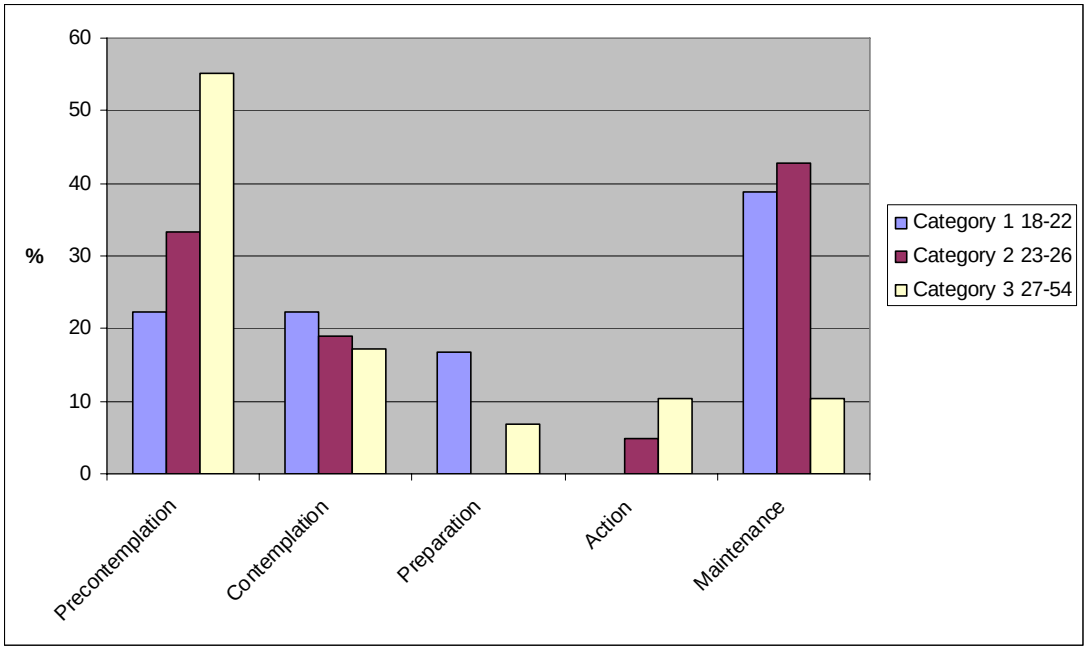
	Category 1 (18-22)	Category 2 (23-26)	Category 3 (27-54)
(Category 1 more agreement pros, less agreement cons - Category 3 less agreement pros and more agreement cons)			
	(n=18)	(n=21)	(n=28)
Fruit servings (%)			
1 serve or less	17.65	23.53	58.82
2 servings	20.00	53.33	26.67
3 servings or more	50.00	27.78	22.22

Comparisons determined by the Fisher's Exact Test (P=0.0182)

6.6.2.2 The relationship between the decisional balance for eating 2 servings of fruit per day and the stages of change for eating 2 servings of fruit per day

When decisional balance measures were summed (pros/cons) and grouped into 3 categories there was a significant relationship with the stage of change for fruit consumption (P=0.0412) (Figure 5). Precontemplation shows a higher percentage of participants with low pros and high cons for eating 2 servings of fruit per day. The maintenance stage in comparison has fewer participants in category 3 and more participants in category 1 and 2, therefore high pros of eating 2 servings of fruit per day and low cons.

Figure 5: Decisional balance for eating 2 servings of fruit per day compared to the stages of change stage for eating 2 servings of fruit per day (all participants)



Comparisons determined by the Fisher's Exact Test (P=0.0412)

6.6.3 Efficacy for eating fruit

A high self-efficacy for the consumption of fruit was demonstrated in all the groups with no significant differences between the groups (Table 13).

Table 13: Self-efficacy for eating fruit (2 servings per day), comparison between the groups

Total *(n=68/68)*	*Control (n=25/25)* CG	*Intervention (n=24/24)* HPG	*Intervention (n=19/19)* NG	*(P)*
I can include fruit in my evening meal when I eat at home				
Agree	92.00	83.33	73.68	
Neither agree nor disagree	4.00	4.17	21.05	
Disagree	4.00	12.50	5.26	(0.1804)
I can include fruit as part of a snack, most of the time				
Agree	92.00	91.67	84.21	
Neither agree nor disagree	8.00	8.33	10.53	
Disagree	0.00	0.00	5.26	(0.5994)
(n=68/68)	*(n=24/25)* CG	*(n=24/24)* HPG	*(n=19/19)* NG	
I can include fruit when I pack my lunch, most of the time				
Agree	87.50	100.00	89.47	
Neither agree nor disagree	8.33	16.67	10.53	
Disagree	4.17	12.50	0.00	(0.3620)
I can eat fruit when out with friends and want a snack				
Agree	83.33	79.17	73.68	
Neither agree nor disagree	8.33	12.50	21.05	
Disagree	8.33	8.33	5.26	(0.8091)
I can include fruit each day while on holiday				
Agree	83.33	95.83	84.21	
Neither agree nor disagree	16.67	4.17	15.79	
Disagree	0.00	0.00	0.00	(0.3401)
I can buy fruit most of the time when out for lunch				
Agree	75.00	79.17	63.16	
Neither agree nor disagree	12.50	8.33	26.32	
Disagree	12.50	12.50	10.53	(0.5783)
I can include fruit for breakfast in the morning, most of the time				
Agree	70.83	87.50	89.47	
Neither agree nor disagree	25.00	8.33	10.53	
Disagree	4.17	4.17	0.00	(0.4127)
I can include fruit when on a picnic and I am packing the food				
Agree	91.67	100.00	84.21	
Neither agree nor disagree	4.17	0.00	15.79	
Disagree	4.17	0.00	0.00	(0.1519)

I can order fruit when I'm out for dinner				
Agree	45.83	58.33	42.11	
Neither agree nor disagree	29.17	20.83	31.58	
Disagree	25.00	20.83	26.32	(0.8548)

Between group comparisons determined by the Fisher's Exact Test

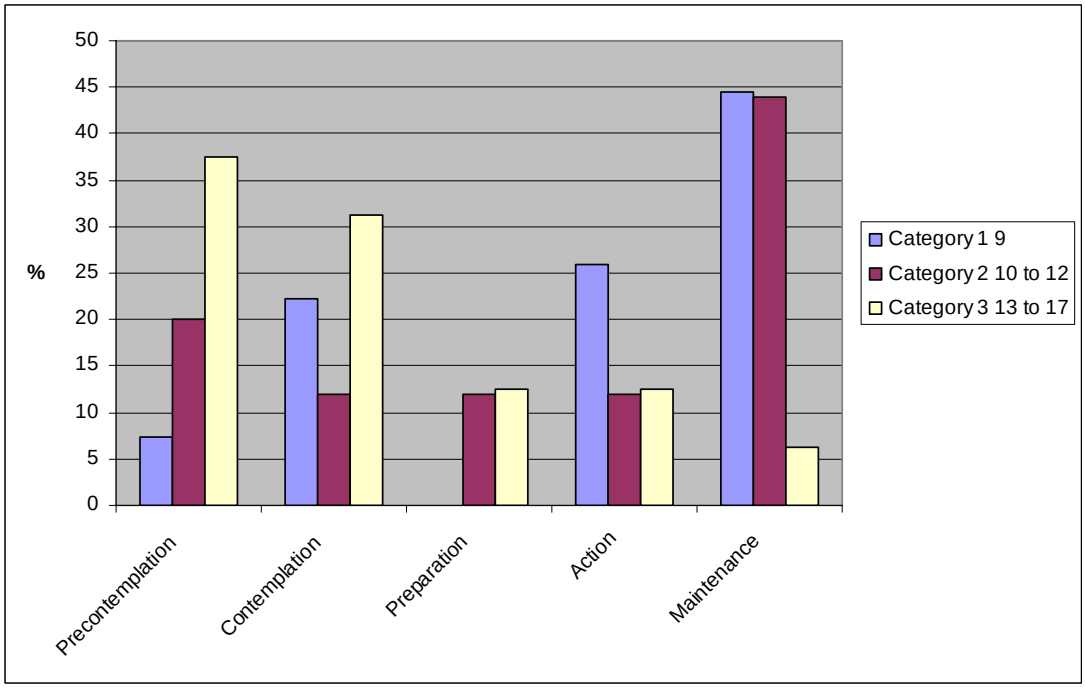
6.6.3.1 *The relationship between the efficacy of eating 2 servings of fruit per day and servings of fruit per day*

The relationship between servings of fruit eaten per day and self-efficacy was not significant.

6.6.3.2 The relationship between efficacy for eating fruit and the stages of change for eating 2 servings of fruit per day

The self-efficacy for fruit consumption was significantly related to the stages of change for eating 2 servings of fruit per day (P=0.0146). Precontemplation demonstrated the highest percentage (38 per cent) of participants with the least agreement with the self-efficacy questions category 3 (13-17 summed score), while maintenance demonstrated the highest percentage (44 per cent) of participants with the most agreement with the self-efficacy questions category 1 (9 summed score) (Figure 6).

Figure 6: Self-efficacy for fruit consumption compared to stages of change for eating 2 servings of fruit per day (all participants)



Comparisons determined by the Fisher's Exact Test (P=0.0146)

6.7 Vegetable intakes

Vegetable intakes were analysed for all groups and overall 51 per cent of the participants consumed 3-4 servings of vegetables per day in T1 compared to 66 per cent in T2. The HPG and the CG increased their vegetable consumption significantly from T1 to T2 (Table 14). Twenty-nine per cent of HPG increased their vegetable intake to 3-4 servings per day. CG made a 16 per cent increase, while the NG stayed the same in T2 as in T1 (Table 14).

Table 14: Vegetable intake at T1 and T2

	Control % (*n=25*) CG		Intervention % (*n=24*) HPG		Intervention % (*n=19*) NG	
	T1	T2	T1	T2	T1	T2
Vegetable consumption						
Less 1 serve/day	16.00	12.00	4.17	0.00	0.00	0.00
1-2 serve/day	48.00	36.00	41.67	16.67	36.84	36.84
3-4 serve/day	36.00	52.00	54.17	83.33	63.16	63.16
	P=0.0391		P=0.0027		P=0.3750	

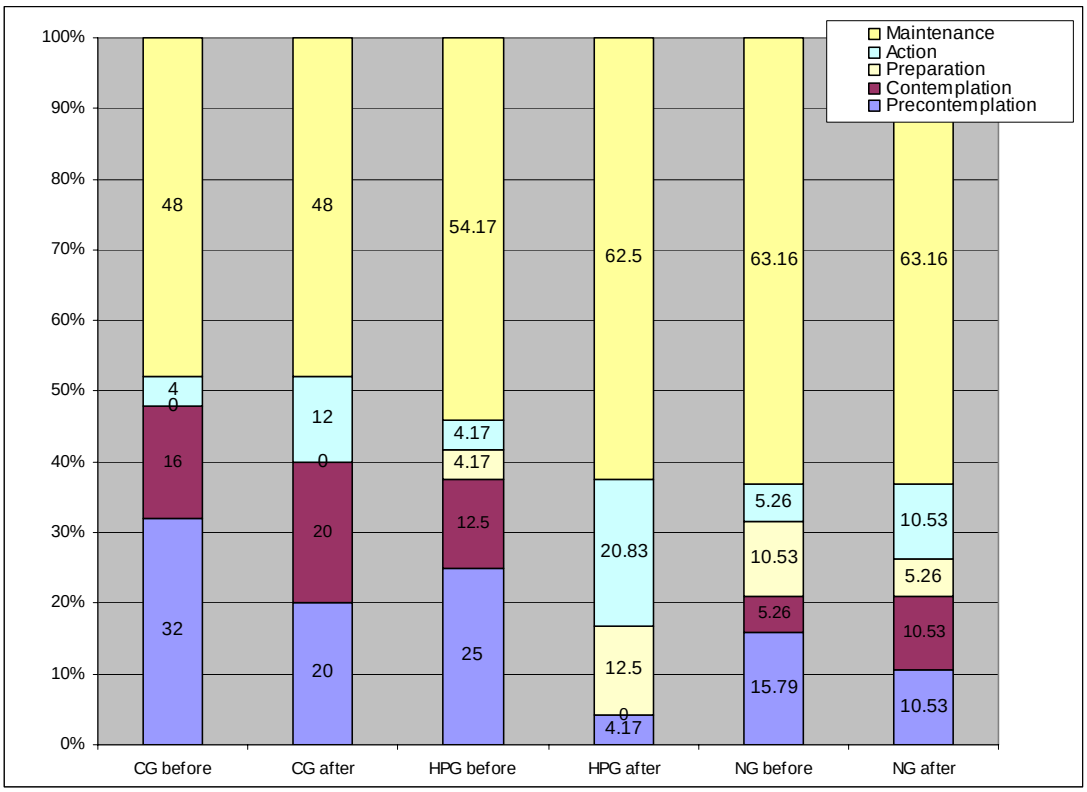
Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.2326) and T2 (P=0.0700)

6.7.1 Stages of change and the groups' movements through the stages for vegetable intakes (3 servings per day)

Figure 7 illustrates the movement between the stages of change for vegetable intakes. The CG and NG do not show any significant movement through the stages of change between T1 & T2, while the HPG demonstrates a significant difference from T1 to T2 (P=0.0137). The movement occurred out of the precontemplation and contemplation stages into preparation, action and maintenance stages (Figure 7).

Figure 7: Stages of change percentages for vegetable intake (3 servings per day) for all groups in T1 and T2



Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0137) NG (P>=1.000) CG (P=0.3125)

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.3898) or in T2 (P=0.6698)

6.7.2 The decisional balance for eating vegetables

Overall there were no differences between the groups for agreement or disagreement with the statements regarding the benefits (pros) of eating vegetables (Table 15).

Table 15: Agreement or disagreement with the pros of eating vegetables (3 servings per day), comparison between the groups

	Total Sample	Control *(n=24/25)* CG	Intervention *(n=24/24)* HPG	Intervention *(n=19/19)* NG	*(P)*
Vegetables are cheap to buy					
Agree	50.00	47.83	45.83	55.56	
Neither agree nor disagree	13.64	17.39	12.50	11.11	
Disagree	36.36	34.78	41.67	33.33	(0.9481)
Eating 3+ servings of vegetables per day would give me plenty of vitamins and minerals					
Agree	87.88	82.61	83.33	100.00	
Neither agree nor disagree	10.61	17.39	12.50	0.00	
Disagree	1.52	0.00	4.17	0.00	(0.2170)
Eating vegetables would help me "cleanse" my body					
Agree	83.33	82.61	83.33	83.33	
Neither agree nor disagree	16.67	17.39	16.67	16.67	
Disagree	0.00	0.00	0.00	0.00	(1.0000)
Eating vegetables is a good way to cut down calories					
Agree	87.88	82.61	91.67	88.89	
Neither agree nor disagree	10.61	17.39	8.33	5.26	
Disagree	1.52	0.00	0.00	5.26	(0.4108)
I would feel good about looking after my health by eating 3 + servings of vegetables per day					
Agree	81.82	73.91	95.83	72.22	
Neither agree nor disagree	15.15	21.74	4.17	22.22	
Disagree	3.03	4.35	0.00	5.56	(0.1383)
I enjoy the taste of most vegetables					
Agree	84.85	73.91	87.50	94.44	
Neither agree nor disagree	9.09	17.39	8.33	0.00	
Disagree	6.06	8.70	4.17	5.56	(0.3701)
(n=66/68)	*(n=24/25)* CG	*(n=24/24)* HPG	*(n=18/19)* NG		
Eating 3 + servings of vegetables per day would mean that I'm less likely to get cancer					
Agree	34.85	26.09	41.67	33.33	
Neither agree nor disagree	53.03	47.83	58.33	55.56	
Disagree	12.12	26.09	0.00	11.11	(0.1015)
People who eat plenty of vegetables look healthier					
Agree	48.48	39.13	54.17	55.56	
Neither agree nor disagree	39.39	39.13	37.50	38.89	
Disagree	12.12	21.74	8.33	5.56	(0.5863)
Vegetables are important in relation to enjoying physical exercise					
Agree	56.06	56.52	66.67	38.89	
Neither agree nor disagree	27.27	26.09	29.17	27.78	
Disagree	16.67	17.39	4.17	33.33	(0.1551)
Vegetables are a quick and easy snack					
Agree	60.61	52.17	58.33	77.78	

Neither agree nor disagree	22.73	30.43	20.83	16.67	
Disagree	16.67	17.39	20.83	5.56	(0.4734)
It's worthwhile spending extra money on vegetables					
Agree	84.85	73.91	91.67	94.44	
Neither agree nor disagree	12.12	17.39	8.33	5.56	
Disagree	3.03	8.70	0.00	0.00	(0.2988)

Between group comparisons determined by the Fisher's Exact Test

There were no between group differences for the cons statements (Table 16).

Table 16: Agreement or disagreement with the cons of eating vegetables (3 servings per day), comparison between the groups

	Total Sample	Control *(n=24/25)* CG	Intervention *(n=24/24)* HPG	Intervention *(n=18/19)* NG	*(P)*
I would feel I would be over eating if I ate 3 + servings of vegetables per day					
Agree	6.06	4.35	4.17	11.11	
Neither agree nor disagree	10.61	8.70	16.67	5.56	
Disagree	83.33	86.96	70.17	83.33	(0.7630)
(n=65/68)	*(n=24/25)* CG	*(n=23/24)* HPG	*(n=18/19)* NG		
Ordering vegetables when I eat out doesn't give me value for money					
Agree	9.23	17.39	8.70	0.00	
Neither agree nor disagree	24.62	21.74	30.43	22.22	
Disagree	66.15	60.87	60.87	77.78	(0.4183)
(n=66/68)	*(n=24/25)* CG	*(n=24/24)* HPG	*(n=18/19)* NG		
I would worry about pesticides if I ate 3 or more servings of vegetables per day					
Agree	1.52	4.35	0.00	0.00	
Neither agree nor disagree	21.21	26.09	16.67	22.22	
Disagree	77.27	69.57	83.33	77.78	(0.7214)
I get a bad reaction if I eat more of certain vegetables					
Agree	0.00	0.00	0.00	0.00	
Neither agree nor disagree	10.61	8.70	16.67	5.56	
Disagree	89.39	91.30	83.33	94.44	(0.6055)
I don't like the taste and/or texture of most vegetables					
Agree	9.09	17.39	4.17	5.56	
Neither agree nor disagree	9.09	17.39	8.33	0.00	
Disagree	81.82	65.22	87.50	94.44	(0.1413)
Preparing and cooking vegetables is time consuming					
Agree	36.36	21.74	37.50	50.00	
Neither agree nor disagree	16.67	21.74	12.50	16.67	

Disagree	46.97	56.52	50.00	33.33	(0.3867)
(n=68/68)	*(n=25/25)* CG		*(n=24/24)* HPG	*(n=19/19)* NG	
Vegetables don't store well					
Agree	25.76	26.09	29.17	22.22	
Neither agree nor disagree	31.82	34.78	33.33	22.22	
Disagree	42.42	39.13	37.50	55.56	(0.8152)

Between group comparisons determined by the Fisher's Exact Test

Analysing the summed categorized pros and cons of eating vegetables revealed no significant differences between the groups (Table 17).

Table 17: Relationship between decisional balance and intervention groups

	Control (*n=25*) CG	Intervention (*n=24*) HPG	Intervention (*n=19*) NG
Sum of Pros/Cons (the lowest score with complete agreement is 18, the highest with complete disagreement 54)			
Category 1 (18-22)	30.43	37.50	33.33
Category 2 (23-27)	26.09	33.33	50.00
Category 3 (28-54)	43.08	29.17	16.67

Between group comparisons determined by the Fisher's Exact Test (P=0.4033)

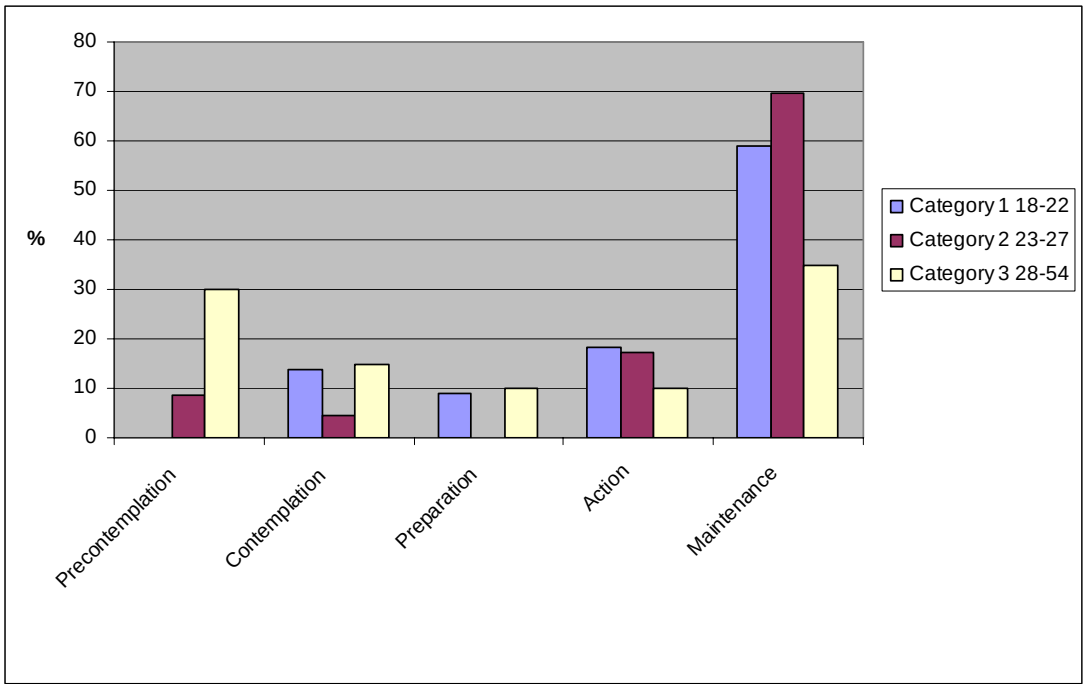
6.7.2.1 The relationship between the decisional balance for eating 3 servings of vegetables per day and vegetable intake

No relationship was observed between the summed pros and cons of eating vegetables and servings of vegetables.

6.7.2.2 The relationship between the decisional balance for eating 3 servings of vegetables per day and the stages of change for eating 3 servings of vegetable per day

Looking at the relationship between the categorized pros and cons and the stages of change a significant relationship was observed (P=0.0497). The highest percentages of participants found in maintenance represented category 1 and 2 (high pros/low cons) compared to the precontemplation stage with the highest percentage of participants in category 3 (low pros/ high cons) (Figure 8).

Figure 8: Decisional balance for eating 3 servings of vegetables per day compared to stages of change for eating 3 servings of vegetables per day (all participants)



Between group comparisons determined by the Fisher's Exact Test (P=0.0497)

6.7.3 Self-efficacy for eating vegetables

Overall there were no significant differences between the groups for the self-efficacy of eating vegetables (Table 18).

Table 18: Self-efficacy for eating vegetables (3 servings per day), comparison between the groups

Total	Control	Intervention	Intervention	(P)
(n=68/68)	*(n=24/25)* CG	*(n=24/24)* HPG	*(n=19/19)* NG	
I can include vegetables with my evening meal when I eat at home				
Agree	96.00	100.00	100.00	
Neither agree nor disagree	4.00	0.00	0.00	
Disagree	0.00	0.00	0.00	(1.0000)
(n=68/68)	*(n=25/25)* CG	*(n=24/24)* HPG	*(n=19/19)* NG	
I can include vegetable as part of a snack, most of the time				
Agree	60.00	70.83	68.42	
Neither agree nor disagree	20.00	25.00	10.53	
Disagree	20.00	4.17	21.05	(0.3569)
(n=68/68)	*(n=25/25)* CG	*(n=24/24)* HPG	*(n=19/19)* NG	

I can include vegetables when I pack my lunch, most of the time				
Agree	68.00	87.50	68.42	
Neither agree nor disagree	12.00	8.33	10.53	
Disagree	20.00	4.17	21.05	(0.3980)
I can eat vegetables when out with friends and want a snack				
Agree	40.00	62.50	52.63	
Neither agree nor disagree	40.00	33.33	26.32	
Disagree	20.00	4.17	21.05	(0.3063)
I can include vegetables each day while on holiday				
Agree	84.00	91.67	89.47	
Neither agree nor disagree	12.00	8.33	0.00	
Disagree	4.00	0.00	10.53	(0.3176)
I can buy vegetables most of the time when out for lunch				
Agree	68.00	75.00	63.16	
Neither agree nor disagree	12.00	16.67	15.79	
Disagree	20.00	8.33	21.05	(0.7709)
I can include vegetables when on a picnic and I am packing the food				
Agree	80.00	95.83	73.68	
Neither agree nor disagree	8.00	4.17	5.26	
Disagree	12.00	0.00	21.05	(0.1601)
I can order vegetables when I'm out for dinner				
Agree	96.00	95.83	100.00	
Neither agree nor disagree	4.00	4.17	0.00	
Disagree	0.00	0.00	0.00	(1.0000)

Between group comparisons determined by the Fisher's Exact Test

Overall there were no significant differences between the groups for self- efficacy for eating vegetables, as measured by the sum of self-efficacy questions categorized into three levels (Table 19).

Table 19: Relationship between self-efficacy and intervention groups

	Control (*n=25*) CG	Intervention (*n=24*) HPG	Intervention (*n=19*) NG
Sum of Efficacy (the lowest score with complete agreement is 8, the highest with complete disagreement 24)			
Category 1 (8)	37.50	54.17	38.89
Category 2 (9-11)	33.33	29.17	27.78
Category 3 (12-24)	29.7	16.67	33.33

Between group comparisons determined by the Fisher's Exact Test (P=0.6984)

6.7.3.1 The relationship between the self-efficacy of eating 3 servings of vegetables per day and servings of vegetables per day

The self-efficacy measure was highly significantly related to servings of vegetables consumed per day (P=0.0003) (Table 20). However, within group comparisons of self-efficacy and vegetable intake revealed only the HPG (P=0.0109) (Table 21) demonstrated a significant relationship compared to NG (P=0.2796) and CG (P=0.1073).

Table 20: Relationship between vegetable intake and self-efficacy

	Category 1 (8)	Category 2 (9-11)	Category 3 (12-24)
(Category 1 more agreement efficacy statements - Category 3 less agreement efficacy statements)	*(n=29)*	*(n=20)*	*(n=17)*
Servings vegetables per day (%)			
Less 1 serve/day	0.00	1.52	3.03
1-2 serves/day	7.58	6.06	16.67
3or more serves/day	36.36	22.73	6.06

Comparisons determined by the Fisher's Exact Test (P=0.0003)

Table 21: Relationship between vegetable intake and self-efficacy for the HPG

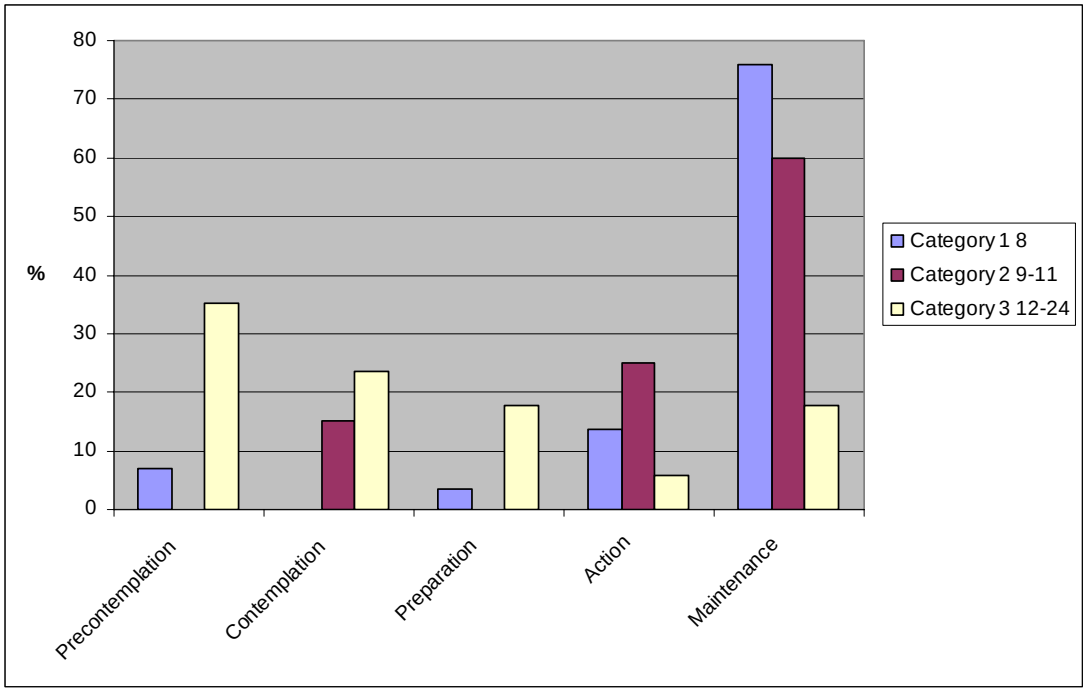
	Category 1 *(8)*	Category 2 *(9-11)*	Category 3 *(12-24)*
(Category 1 more agreement efficacy statements - Category 3 less agreement efficacy statements)	*(n=13)*	*(n=7)*	*(n=4)*
Servings vegetables per day (%)			
Less 1 serve/day	0.00	0.00	0.00
1-2 serves/day	4.17	0.00	12.50
3 or more serves/day	50.00	29.17	4.17

Comparisons determined by the Fisher's Exact Test (P=0.0109)

6.7.3.2 The relationship between self-efficacy for eating vegetables and the stages of change for eating 3 servings of vegetables per day

The relationship between self-efficacy for vegetable consumption and the stages of change for eating 3 servings of vegetables per day is highly significant (P=0.00002) (Figure 9).

Figure 9: Self-efficacy for vegetable consumption compared to stages of change for eating 3 servings of vegetables per day (all participants)



Comparisons determined by the Fisher's Exact Test (P=0.00002)

6.8 Healthy Snacking

6.8.1 High fat/high sugar snacks

Overall the groups' intakes of high fat/high sugar snacks at T2 was not significantly different than that reported at T1 (P=0.4217) (Table 22). Within group comparisons however, demonstrated a significant difference in consumption between T1 and T2 for the HPG (P<0.0001) and CG (P=0.0194) unlike the NG (P=0.2520). The decrease in high fat/high sugar foods occurred with significant decreases in chippie (P=0.0164) and biscuits/cake (P=0.0283) consumption.

Analysis of low fat/low sugar snacking between the groups demonstrated no significant increase from T1 to T2 (Table 22). Within group comparisons however, again demonstrate the HPG (P=0.0112) with significant changes from T1 to T2 unlike the NG (P=0.1445) and CG (P=0.6952). These significant changes occurred for individual foods in the muesli bar (P=0.0240 Wilcoxon Rank Sum Test) and fruit consumption (P=0.0352 Fisher's Exact Test). The change in fruit consumption for fruit T1 to T2 was not the same between the groups, with 46 per cent of the HPG

participants increasing their consumption compared to the NG and CG with an increase of 21 per cent and 13 per cent respectively (Table 23).

Table 22: Change after comparing the difference in high fat/high sugar and low fat/low sugar foods between T1 and T2

	Control (*n=22*) CG	Intervention (*n=22*) HPG	Intervention (*n=16*) NG	
High fat/high sugar foods				
% Decrease	63.64	77.27	50.00	
% No Change	22.73	18.18	31.25	
% Increase	13.65	4.55	18.75	(P=0.4217)
	Control (*n=19*) CG	Intervention (*n=21*) HPG	Intervention (*n=13*) NG	
Low fat/low sugar foods not including muesli bars				
% Increase	21.05	52.38	46.15	
% No Change	42.11	38.10	30.77	
% Decrease	36.84	9.52	23.08	(P=0.5103)

Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0112) NG (P=0.2520) CG (P=0.0194)

Between group comparisons determined by the Fisher's Exact Test

Table 23: Change for fruit as snack between T1 and T2

	Control (*n=24*) CG	Intervention (*n=24*) HPG	Intervention (*n=19*) NG
Fruit			
Increase	12.50	45.83	21.05
No Change	66.67	54.17	73.68
Decrease	20.84	0.00	5.26

Between group comparisons determined by the Fisher's Exact Test (P=0.0352)

6.8.2 High fat/high sugar and low fat/low sugar drinks

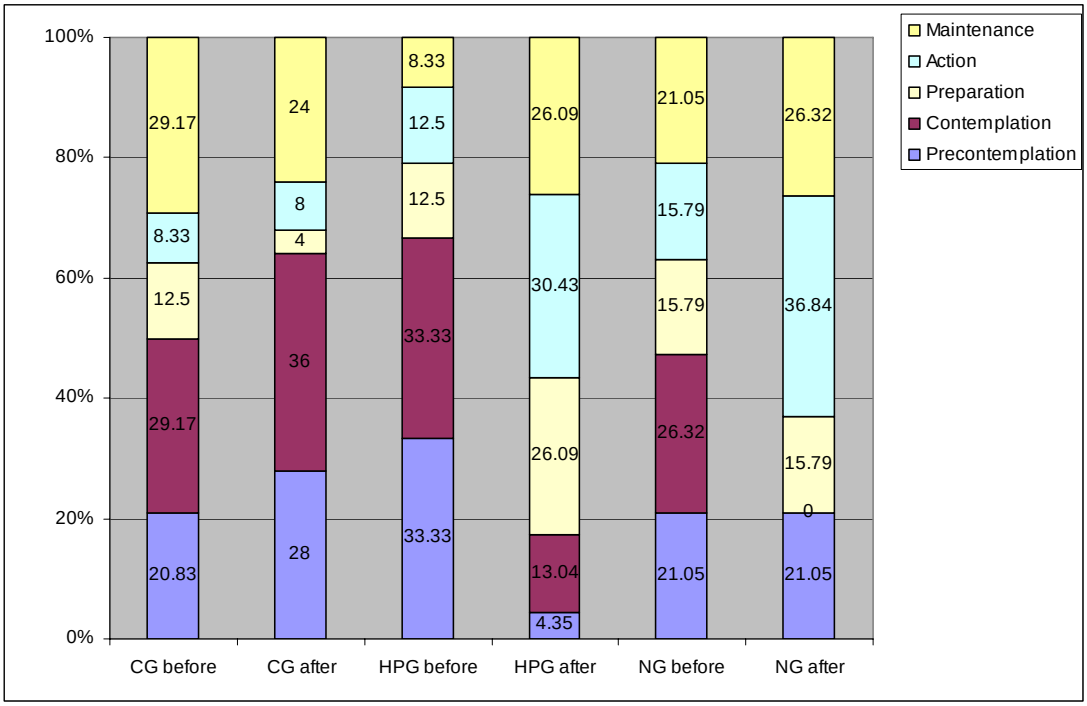
No statistically significant differences occurred between the groups for reported consumption of high fat/high sugar drinks at T1 or T2. Within group comparisons however reported significant decrease from T1 to T2 for the HPG (P=0.0056) and a trend toward change for CG (P=0.0767) unlike the NG (P=0.1965). In addition the low fat/low sugar drinks within group comparisons demonstrated a significant

increase for the NG (P=0.0352) and a trend toward change for the HPG (P=0.0823) unlike the CG (P=0.7112).

6.8.3 Stages of change and the groups' movements through the stages for healthy snacking

Before the intervention there were no differences between the groups for the stage of change for eating healthy snacks, while at T2 there was a highly significant variation between the groups (P=0.0018) (Figure 10). The HPG moved from having a median of 2 (contemplation) to a median of 4 (action), while the NG also made a shift from a median of 3 (preparation) to a median of 4 (action). The CG median moved backwards from 3 (preparation) to 2 (contemplation). Approximately 50 per cent of the HPG moved from the precontemplation and contemplation stages (Figure 10 & 11).

Figure 10: Stages of change percentages on healthy snacking for all groups in T1 and T2



Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0001) NG (P=0.0703) CG (P=0.3828)

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.8145) T2 (P=0.0086)

Figure 11: HPG percentage movement through the stages for healthy snacking

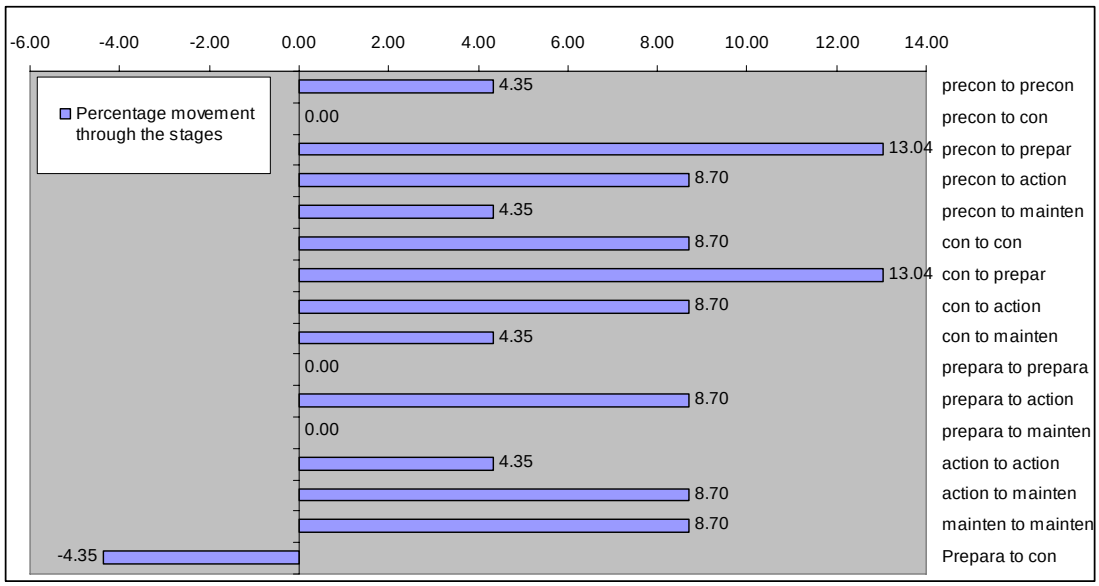


Figure 12: NG percentage movement through the stages for healthy snacking

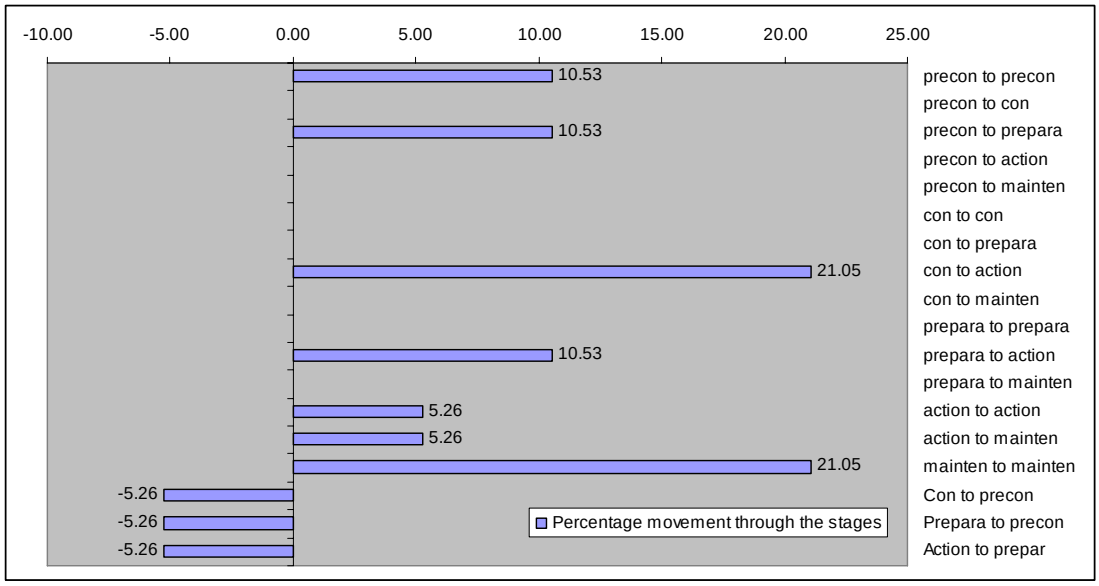
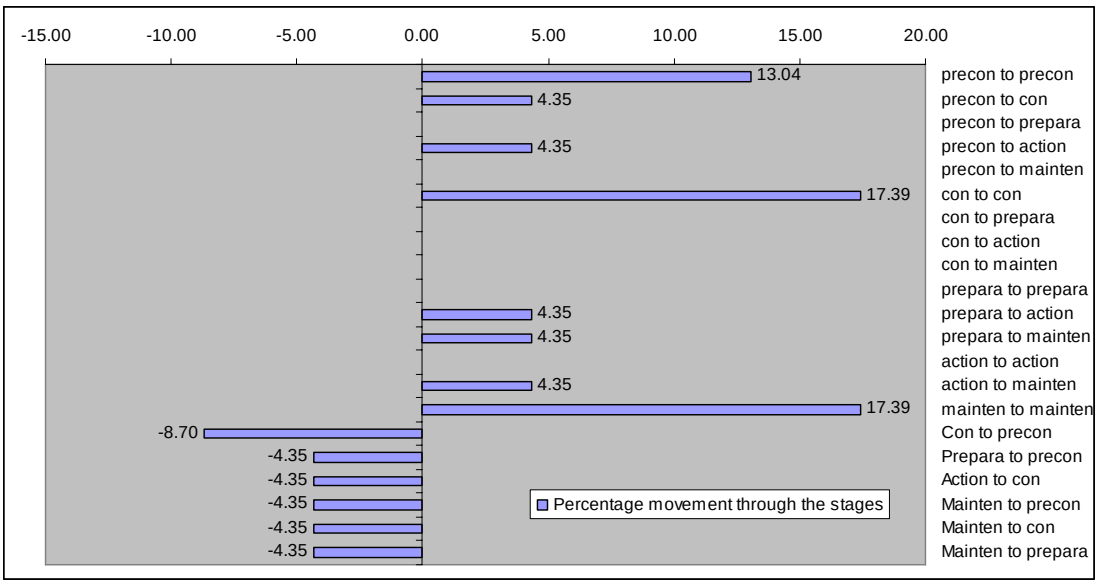


Figure 13: CG percentage movement through the stages for healthy snacking



6.7.1 Decisional balance for eating healthy snacks

All three groups have similar percentages of participants in agreement with the pros for eating healthy snacks and there were no significant differences (Table 24). Similarly, the cons questions do not demonstrate a significant difference between the groups (Table 25).

Table 24: Agreement or disagreement with the pros of healthy snacking, comparison between the groups

Total	Control	Intervention	Intervention	(P value)
(*n=67/68*)	(*n=25/25*) CG	(*n=24/24*) HPG	(*n=18/19*) NG	
Healthy snacks are cheap to buy				
Agree	16.00	41.67	50.00	
Neither agree nor disagree	24.00	12.50	5.56	
Disagree	60.00	45.83	44.44	(0.1199)
(*n=68/68*)	(*n=25/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
Eating healthy snacks gives a person more vitamins than if they eat other snacks				
Agree	80.00	95.83	94.74	
Neither agree nor disagree	16.00	4.17	5.26	
Disagree	4.00	0.00	0.00	(0.3475)
Eating healthy snacks is a way to cut down calories				
Agree	84.00	83.33	89.47	
Neither agree nor disagree	12.00	12.50	0.00	
Disagree	4.00	4.17	10.53	(0.5007)
I would feel good about looking after my health by eating healthy snacks				

Agree	76.00	83.33	89.47	
Neither agree nor disagree	24.00	12.50	10.53	
Disagree	0.00	4.17	0.00	(0.4633)
I enjoy the taste of most healthy snacks				
Agree	68.00	70.83	84.21	
Neither agree nor disagree	12.00	20.83	0.00	
Disagree	20.00	8.33	15.79	(0.2405)
It's worthwhile to spend extra money on healthy snacks				
Agree	56.00	70.83	57.89	
Neither agree nor disagree	32.00	20.83	36.84	
Disagree	12.00	8.33	5.26	(0.7211)
People who eat healthy snacks look healthier				
Agree	44.00	50.00	42.11	
Neither agree nor disagree	36.00	33.33	52.63	
Disagree	20.00	16.67	5.26	(0.5596)
Healthy snacks are important in relation to enjoying physical exercise				
Agree	72.00	75.00	73.68	
Neither agree nor disagree	16.00	12.50	21.05	
Disagree	12.00	12.50	5.26	(0.8868)

Between group comparisons determined by the Fisher's Exact Test

Table 25: Agreement or disagreement with the cons of healthy snacking, comparison between the groups

Total (*n=68/68*)	Control (*n=25/25*) CG	Intervention (*n=24/24*) HPG	Intervention (*n=19/19*) NG	(P value)
Healthy snacks don't keep me going during the day				
Agree	32.00	16.67	21.05	
Neither agree nor disagree	32.00	45.83	26.32	
Disagree	36.00	37.50	52.63	(0.4924)
I don't like the taste of healthy snacks				
Agree	12.50	8.33	15.79	
Neither agree nor disagree	20.83	25.00	31.58	
Disagree	66.67	66.67	52.63	(0.8414)
It is often difficult to find healthy snacks				
Agree	20.00	29.17	10.53	
Neither agree nor disagree	24.00	20.83	26.32	
Disagree	56.00	50.00	63.16	(0.6873)
(n=67/68)	(*n=24/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
Healthy snacks are a hassle to prepare				
Agree	20.83	29.17	5.26	
Neither agree nor disagree	25.00	25.00	36.84	
Disagree	54.17	45.83	57.89	(0.3851)

Between group comparisons determined by the Fisher's Exact Test

Analysis of the decisional balance (summed categories for the pros and cons) of healthy snacking did not demonstrate significant differences between the groups (Table 26).

Table 26: Relationship between decisional balance and intervention groups

	Control (*n=25*) CG	Intervention (*n=24*) HPG	Intervention (*n=19*) NG
Sum of Pros and Cons (the lowest score with complete agreement is 12, the highest with complete disagreement 36)			
Category 1 (12-15)	24.00	33.33	42.11
Category 2 (16-20)	36.00	41.67	31.58
Category 3 (21-36)	40.00	25.00	26.32

Between group comparisons determined by the Fisher's Exact Test (P=0.6628)

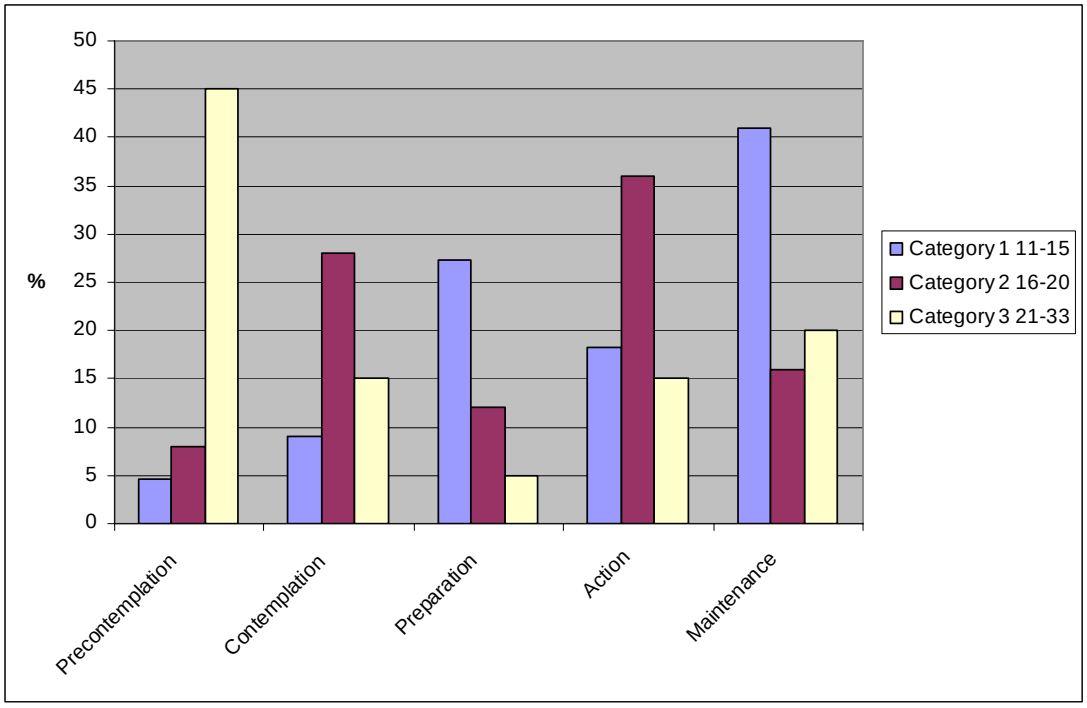
6.7.1.1 The relationship between the decisional balance of eating healthy snacks and healthy snacking intakes

The decisional balance for healthy snacking is not related to current healthy snacking scores for all participants or for any of the groups (Fisher's Exact Test P=0.4164).

6.7.1.2 The relationship between the decisional balance of eating healthy snacks and the stages of change for healthy snacking

The relationship between the decisional balance of healthy snacking and the stages of change for healthy snacking is highly significant (P=0.0063) (Figure 14). Participants in precontemplation were more likely to disagree with the pros and agree with the cons (category 3) compared to those participants in maintenance that were more likely to agree with pros and disagree with the cons (category 1).

Figure 14: Decisional balance for healthy snacking compared to stages of change for healthy snacking (all participants)



Comparisons determined by the Fisher's Exact Test (P=0.0063)

6.7.2 Self-efficacy for eating healthy snacks

All groups show similar high self-efficacy, except for the statement "*I can include healthy snacks each day while on holiday*". For this statement there is a statistically significant difference between the groups (P=0.0473) with NG agreeing with this statement 100 per cent compared to CG with 70 per cent in agreement (Table 27).

Table 27: Self-efficacy for healthy snacking, comparison between the groups

Total (*n=68/68*)	Control (*n=25/25*) CG	Intervention (*n=24/24*) HPG	Intervention (*n=18/19*) NG	(P value)
I can buy healthy snacks for morning and afternoon tea				
Agree	64.00	75.00	78.95	
Neither agree nor disagree	20.00	12.50	0.00	
Disagree	16.00	12.50	21.05	(0.3370)
I can include healthy snacks when I pack my lunch, most of the time				
Agree	80.00	100.00	84.21	
Neither agree nor disagree	8.00	0.00	10.53	
Disagree	12.00	0.00	5.26	(0.2054)
I can buy healthy snacks when I am out with friends				
Agree	64.00	70.83	63.16	

Neither agree nor disagree	20.00	16.67	15.79	
Disagree	16.00	12.50	21.05	(0.9474)
(n=67/68)	(*n=24/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
I can include healthy snacks each day while on holiday				
Agree	70.83	83.33	100.00	
Neither agree nor disagree	16.67	16.67	0.00	
Disagree	12.50	0.00	0.00	(0.0473)
I can include healthy snacks when on a picnic and I am packing the food				
Agree	83.33	95.83	100.00	
Neither agree nor disagree	12.50	4.17	0.00	
Disagree	4.17	0.00	0.00	(0.2739)
(n=66/68)	(*n=23/25*) CG	(*n=24/24*) HPG	(*n=19/19*) NG	
I know how to choose healthy snacks				
Agree	82.61	91.67	84.21	
Neither agree nor disagree	17.39	4.17	15.79	
Disagree	0.00	4.17	0.00	(0.4244)

Between group comparisons determined by the Fisher's Exact Test

With the summed data categorized into 3 groups, category 1 with most agreement and category 3 with the least agreement with the self-efficacy statements for healthy snacking, there were no significant differences between the groups (P=0.6333) (Table 28).

Table 28: Relationship between self-efficacy and intervention groups

	Control *(n=25) CG*	Intervention *(n=24) HPG*	Intervention *(n=19) NG*
Sum of Efficacy (the lowest score with complete agreement is 6, the highest with complete disagreement 18)			
Category 1 (6)	36.00	54.17	52.63
Category 2 (7)	28.00	12.50	15.79
Category 3 (8-18)	36.00	33.33	31.58

Between group comparisons determined by the Fisher's Exact Test (P=0.6333)

6.7.2.1 *The relationship between the self-efficacy of healthy snacking and healthy snacking intake*

No relationship was demonstrated between self-efficacy for eating healthy snacks and actual healthy snack consumption.

6.7.2.2 *The relationship between self-efficacy of healthy snacking and the stages of change for healthy snacking*

No relationship was demonstrated between self-efficacy and the stages of change for healthy snacking (P=0.5062).

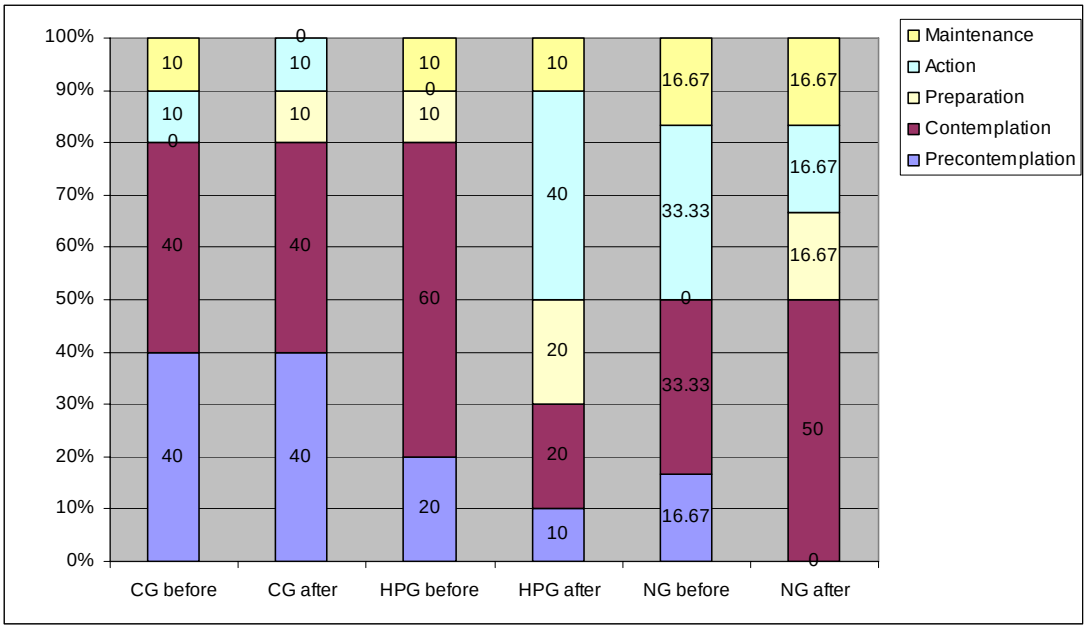
6.8 Smoking

All three groups had similar proportion of participants who smoked cigarettes. The HPG has 42 per cent who are smokers, NG 33 per cent and CG 38 per cent. After 6 months there were no quitters, however movement was evident for the stages of change for cutting down smoking.

6.8.1 *Stages of change and the groups' movements through the stages for smoking*

In T1 and in T2 analysis between the groups demonstrated no significant differences (Figure 16). Looking at the groups individually over time however, revealed the HPG made a trend toward movement through the stages (P=0.0625) compared to NG (P>=1.0000) and CG (P>=1.0000) (Figure 15 & 16).

Figure 15: Stages of change percentages for cutting down smoking for all groups in T1 and T2



Within group comparisons T1-T2 determined by Wilcoxon Rank Sum Test paired test HPG (P=0.0625) NG (P>=1.0000) CG (P>=1.0000)

Between group comparisons determined by the Fisher's Exact Test T1 (P=0.5172) T2 (P=0.3560)

Figure 16: HPG percentage movement through the stages for cutting down on smoking

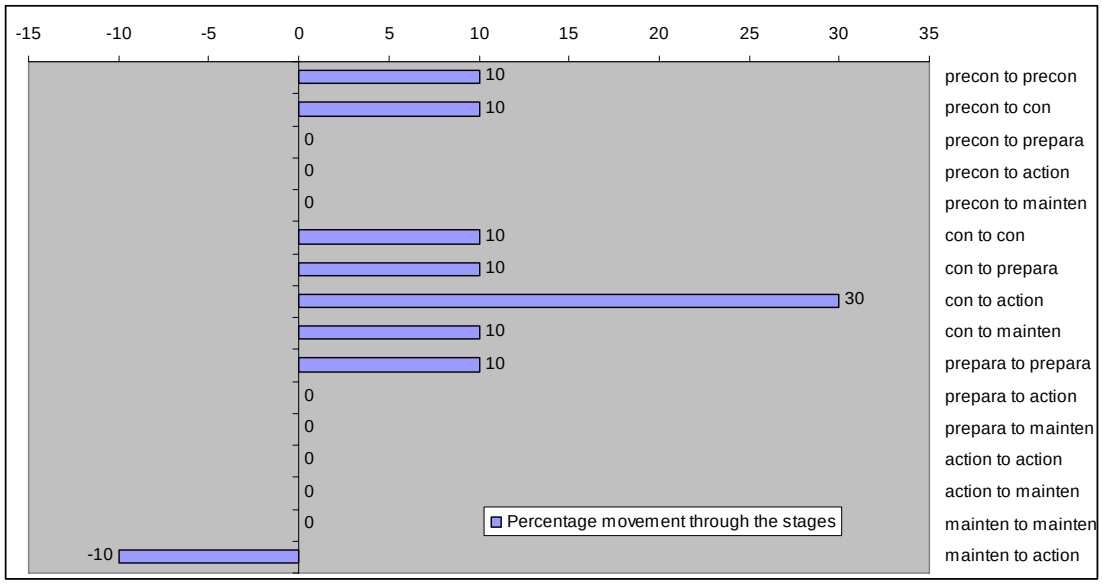
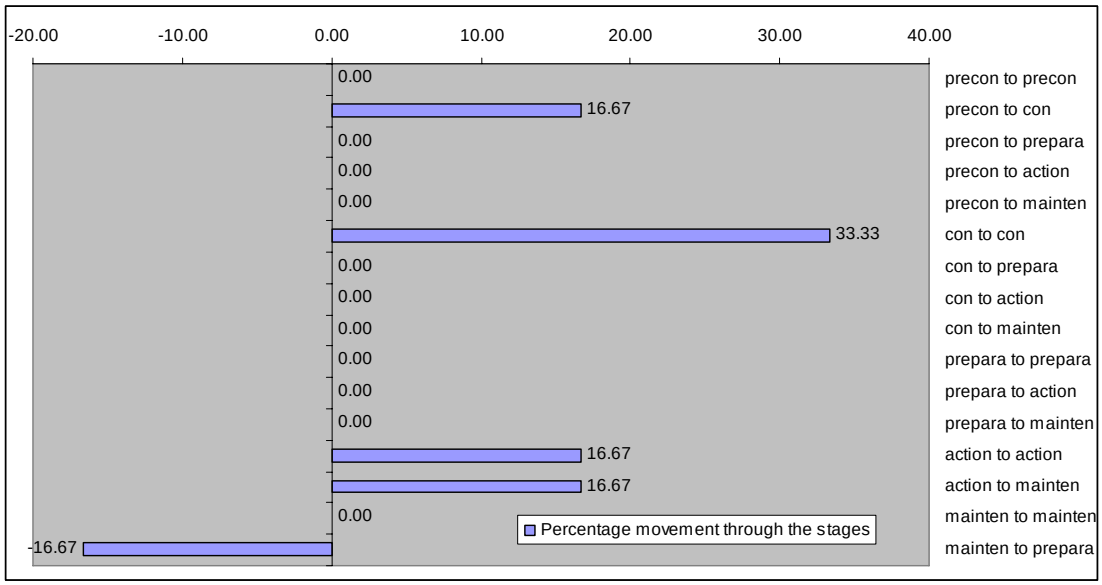


Figure 17: NG percentage movement through the stages for cutting down on smoking



7. **DISCUSSION**

The aim of this research was to determine whether the 10,000 Steps @ work 'lite' programme acts as a 'gateway' to behavourial changes in a call centre environment for the intakes of fruit, vegetables, healthy snacking and for smoking. Participants were asked to report changes in behaviour over the time span of the programme; change was also measured by the Transtheoretical Model and predicted by decisional balance and self-efficacy. A positive change is a process and movement towards change can be considered to be a small 'success'.

In this current study the health promotion group (HPG), which participated in both the 10,000 Steps @ Work 'Lite' Programme and the nutritional seminar plus weekly Cancer Society LiveSmart emails made significant physical activity related changes compared to the nutritional group (NG), which only took part in the nutritional component and the control group (CG), which did not participate in the health promotion programme.

The HPG increased their physical activity through increasing their daily steps and number of days exercising as well as increased perceived fitness and moved through the stages of change for physical activity. The NG and the CG also reported increased physical activity during the intervention time, however neither of these two groups increased their perceived fitness or movemented through the stages of change for physical activity. Compared to the CG and NG, the HPG increased their average physical activity to come close to the recommended five or more days per week of physical activity for 30 minutes or more per day (MOH, 2008). Both the NG and CG although not involved in the physical activity programme may have increased their perceived fitness due to the intervention period moving into summer or from the influence of the 10,000 step programme within the call centre.

Physical activity impacts on weight, cholesterol, diabetes mellitus (Thompson et al., 2003) and lower blood pressure (Moreau et al., 2001). Individuals with sedentary behaviour are more than twice as likely to develop heart disease as the most active individuals (Paffenbarger et al., 1993). Thompson et al. (2004) confirmed that women who walked more had a lower percentage body fat, and those who walked at least 10,000 steps per day or more on average achieved a normal body mass index

(BMI). The call centre environment is a sedentary environment therefore the importance of supporting physical activity within the work place is vital for the health of employees.

Physical activity programmes improve fitness (Pohjonen and Ranta, 2001) and Proper et al. (2003) found during their PACE programme those individuals who set goals to become more active (moderate or vigorous) made significant changes. Possibly the most important part of this current programme involved goal setting. The HPG not only aimed for the individual goal of 10,000 steps per day, but also had a team goal to be the first team to 'virtually' walk around New Zealand. Targeting individuals' steps goals may prove an important motivator for the majority of participants. Stahl et al. (2001) examined how social, physical and policy environments affect physical activity. If support is provided in all three environments, work, social and home, individuals are more likely to be physically active. Increasing the physical activity of workers in call centres may help combat the sedentary aspect of the call centre environment and may be especially important in this call centre where the majority of the employees are female. Research reported New Zealand women are more likely to be sedentary than men and have become increasingly sedentary since 2002/03 (MOH, 2008).

This research examined the hypothesis that physical activity may be a 'gateway' to positively changing other behaviours such as dietary and smoking behaviours (Blakely et al., 2004; Tucker and Reicks, 2002; Elder and Roberts, 2007). In this current study the HPG was the only group involved in the physical activity programme and reported an increase in a wider range of indicators related to physical activity compared to the other two groups. Both the HPG and the NG received information on healthy eating and both made positive dietary changes, but the CG also made positive behaviour changes during the intervention even though they were not part of the intervention. Overall however, compared to the NG and the CG, the HPG consistently reported positive behavioural changes and movement through the stages of change for diet therefore moderately supporting physical activity acted as a 'gateway' to other behavioural changes. The physical activity during the intervention may have motivated other behavioural changes in the HPG with the goal

of 10,000 steps per day motivating other goals such as increasing healthy snacking, fruit and vegetable consumption and reducing smoking.

Biener et al. (1999) emphasized the significance of nutritional promotion programmes in the workplace. MOH (2008) reports a decline in vegetable intake from 2002/03 to 2006/07. Health programmes promoting good nutrition are not only important for the workers, but may be important to families as research has identified a correlation between family dinners and the self-efficacy of eating healthier food for adolescents (Granner et al., 2004). Parents making nutritional behavioural changes at work may also make changes at home.

Krebs-Smith et al. (1995) observed knowledge of the number of servings required was strongly correlated with increased fruit and vegetable intakes. Both the HPG and NG received information on the recommended number of servings per day through the MOH (2004 (b)) "Eating for Healthy Adult New Zealanders" brochure as well as receiving comprehensive information on fats and sugars. The HPG increased both their fruit and vegetable consumption, while the NG only increased their fruit consumption. The NG vegetable consumption was close to the national average (MOH, 2008); therefore this group may not have felt a need to increase their consumption. The CG also increased vegetable consumption even though they did not participate in the health promotion programme. The improvement in the HPG and CG vegetable consumption may be due to the change in seasons from winter to summer. Levin is also a well known vegetable and fruit growing area and local produce is cheap and reliable, especially during the summer period (Kamphuis et al., 2006). However, if this is purely a seasonal effect we would expect an increase in the NG. In addition the respondents in the CG group may have been highly motivated and interested in the health promotion programme therefore making positive behaviour changes to become part of future programmes. This research however cannot support or refute this possibility

Healthy snacking was a focus in the nutritional information given to the HPG and NG through the nutritional seminars and weekly emails. Healthy snacking did increase and unhealthy snacking decreased significantly for the HPG. The CG also had a significant decrease in unhealthy snacking. The positive changes for the HPG

may suggest the involvement in the 10,000 steps @ work 'lite' programme could have contributed to these changes. The decreases in unhealthy snacking for the CG again demonstrates that this group was possibly affected by the health promotion programme or other environmental factors and became motivated to change their behaviours over the 6 month period. These results may also be an indication of a weakness in the retrospective methodology.

Analysing the foods individually for unhealthy snacking revealed significant differences between the groups for chippie and cake consumption, with decreased consumption over the intervention period by the HPG and CG. This possibly may be due to a conscious effort by participants not to visit the call centre vending machine, which disperses mainly chippies, biscuits/cakes and chocolate bars. The combination of physical activity and the nutritional seminar/emails may also have influenced the significant increases for healthy snacking and decreases in unhealthy snacking/drinks for the HPG compared to the NG, which did not make significant changes in healthy snacking only in healthy drinks.

All three groups included a high percentage of smokers (HPG 42%, NG 33% and CG 38%) compared to national average of 20 per cent of adult New Zealanders (MOH, 2008). This health promotion programme did not provide advice to smokers on the benefits of quitting smoking and there are no quitters after the programme, with the exception of one HPG participant who did quit for a period of time during the programme. Possibly the changing exercise and eating behaviours acted as a 'gateway' to changing smoking behaviours as proposed by Blakely et al. (2004) and may show the importance of multi-faceted programmes for supporting and initializing positive behaviour changes. It could therefore be suggested as other research has observed, multi-faceted health promotion programmes are the most successful in changing health behaviours (Brug et al., 1996).

7.5 Stages of change

In order to change behaviours it is important to recognise the readiness of participants to make this change, the use of the TTM is one way of achieving this (Kasila et al., 2003). This current study did not tailor the physical activity or nutritional seminars to the participant's stages of change and possibly would have

demonstrated more significant results if the interventions were tailored. However, the success of the current study's health promotion programme can be judged not only by behavioural change, but also by movement towards making change with increased readiness measured by stages of change model.

Overall the HPG made significant movements through the stages of change for all measured behaviours, while the NG made significant movements through the stages of change only for fruit intake and healthy snacking. The CG although reporting significant changes in some behaviours including physical activity, did not make any significant movements through the stages of change for the any of the reported behaviours. The lack of movement through the stages of change for the CG would suggest the possibility of over-reporting on some behaviours, due to the effect of the intervention.

Informational support is regarded as an important component when creating a healthy diet and greater knowledge in the later stages of change is important for further movement (Henry et al., 2006). Lach et al. (2004) recommended knowledge programmes as a way to help people in contemplation and preparation stages to change their attitudes or learn what they need to know to make successful changes so they may move into the action stages of positive behaviours. The HPG and NG both received nutritional information at the start of the programme then weekly during the intervention, as well as encouragement towards healthy eating by healthy weekly morning tea shouts (also available to the CG). Brug et al. (1996) established that computer based nutrition information was more likely to be read and remembered than other forms of information. Both the HPG and NG received their weekly Cancer Society LiveSmart coaching by email and therefore these tips if read may have provided a good source of information on healthy eating. The HPG was the only group that demonstrated a trend toward movement through the stages of change for quitting smoking, therefore significantly changing a behaviour such as physical exercise may have had an effect on moving towards quitting smoking (deRuiter and Faulkner, 2006). deRuiter and Faulkner (2006) suggested physical activity could act as a 'gatekeeping' function and smokers who take part in some sort of physical activity are more likely to try quitting (deRuiter and Faulkner, 2008). The difficulty

lies however, in encouraging smokers who statistically are less active than non-smokers to exercise (Taylor and Ussher, 2005).

The transitions between the stages are predicted by the different processes of change at different stages (Prochaska et al., 1992). Rosen (2000) demonstrated that different processes were used for different behaviour changes e.g. for smoking, cognitive-affective processes are used more in earlier stages (especially in contemplation and preparation) than behavioural processes. In comparison, Rosen (2000) found for diet and exercise that cognitive-affective and behavioural processes increased together, especially for diet as cognitive-affective processes were used as much in action and maintenance as the earlier stages. Individuals were found to continually utilize dietary information and recipes (Rosen 2000), suggesting the importance of offering both cognitive-affective and behavioural interventions for all participants throughout the programme. Both information and support were given in an on-going basis over the whole programme to both the HPG and NG groups. This could explain why the HPG moved through the stages for physical activity, fruit and vegetable intakes and healthy snacking and the NG group also demonstrated movement through the stages for fruit and healthy snacking, while the CG did not make any significant movement through the stages.

Cognitive-affective processes such as conscious raising (understanding health issues around increased fruit and vegetables), dramatic relief (affected by others eating fruit and vegetables) and social liberation (healthy morning teas), are generally associated with the pre-action stages (Horwath & Gulliver, 1998). Behavourial processes such as self-liberation (choosing to change), counter-conditioning (substituting fruit and vegetables for high fat/high sugar snacks) and stimulus control (bringing fruit and vegetables to work and avoiding buying snacks from the snack-box), as well as experiencing support from colleagues and management to eat healthier options are all generally associated with the later or post action stages (Horwath and Gulliver, 1998; Henry et al., 2006). Significant movement occurred for the HPG and NG through the stages from precontemplation, contemplation and preparation into action and maintenance could suggest the possible occurrence of cognitive and behavourial processes. These processes were not measured in this study and if health promotion

programmes were to focus on these processes, tailored programmes may give a better result.

7.6 Decisional balance

The balance of pros and cons predict the individual's movement through the stages of change (O'Connell and Velicer, 1988). Overall the pros and cons for vegetables and healthy snacking were very similar between the groups, with high agreement with pros and low with cons. In comparison there was a small, but significant difference for the pros of fruit consumption. Both the HPG and NG demonstrated a slightly higher agreement with the pros compared to the CG; perhaps as a result of the nutrition promotion. However, the NG also demonstrated the highest percentage of participants with low agreement with the pros, which may indicate physical activity had a positive effect on the HPG's perceived benefits of a healthy diet. In other studies the perceived benefits of fruit consumption such as low cost, accessibility and convenience are found to be much more important to participants increasing their consumption than the perceived barriers (Horacek et al., 2002).

In the current study there was a significant relationship between decisional balance and stage of change for physical activity, fruit and vegetable intake and healthy snacking. We would expect those who make a change into action or maintenance will perceive higher benefits and fewer barriers than those who are still in precontemplation or perhaps preparation (Campbell et al., 1998). Gulliver and Horwath (2001 (b)) found barriers were highest in the preparation stage where there was less agreement with the pros. Similarly in this current study those participants having less agreement with the pros and more with the cons for fruit, vegetable and healthy snacking, were more likely to be in precontemplation, while those participants that agreed more with pros and less with the cons were found in the later stages of change.

French (2005) concluded lowering healthy snack prices promoted healthy snacking and decreased intakes of high fat, high sugar foods (French, 2005). Half of the current study's participants perceived the cost of healthy snacking to be high; this is likely to be a significant barrier to making dietary changes (Horacek et al., 2002). To counter-act the perceived barrier of cost, supplying a fruit "bowl" at the cost of the

company would help promote healthy snacking and would be an investment for the health of the employees.

7.7 Self-efficacy

Past researchers observed self-efficacy correlates with fruit and vegetable intake (Granner et al., 2004). In this study there was generally high agreement across all the groups with the self-efficacy statements. The HPG however demonstrated a significant relationship between vegetable consumption and self-efficacy unlike the NG and CG. This may suggest that confidence to consume more vegetables relates to change in consumption as the HPG also increased their vegetable consumption. This is not conclusive though as the CG also reported increased vegetable consumption and did not report significant self-efficacy for vegetable consumption. No relationship was demonstrated between self-efficacy and fruit intake or with healthy snacking.

The current study found relationships between self-efficacy and the stages of change. Henry et al. (2006) observed stages of change are not only related to decisional balance, but also to self-efficacy and self-efficacy is crucial for the movement of participants through all stages of behavioural change (Lippke et al., 2005). This result is also consistent with the research of Campbell et al. (1999) where stages of change for fruit and vegetable intake were strongly correlated with both servings of fruit and vegetables and self-efficacy. In this study the participants with the highest self-efficacy were in both the action and maintenance stages. Henry et al. (2006) observed, like other studies, that self-efficacy is an important factor in the later stages of change. This could suggest that increasing self-efficacy with further intervention may be important in changing to a healthier diet.

Self-efficacy is related to gaining nutritional knowledge, therefore a healthy guide cookbook or regular information and support on how to plan and snack healthily increases self-efficacy (Sullivan et al. 2004). Drichoutis et al. (2005) observed nutritional knowledge led to the likelihood of increased use of food labels and awareness of healthy and unhealthy foods. The nutritional seminar in this current study discussed recommended daily dietary intakes, sugar and fat information, as well as discussing food labels and explaining how to read them.

7.8 Tailored interventions vs untailored interventions

Identifying participants' particular stage and addressing the intervention accordingly may increase success of future interventions. The current study with a retrospective questionnaire was unable to do this. Tailored interventions have demonstrated positive effects and are particularly set-up to support participants depending on their stage of change (Proper et al., 2003). This current study did not allow the tailoring of the health promotion programme to certain stages of change.

7.9 *Weaknesses*

In the current study there is weak evidence that physical activity may be a 'gateway' to other behavioural changes, this supports other studies that have also found physical activity may act as a 'gateway' to other behavioural changes (Blakely et al., 2004, Tucker and Reicks, 2002; Elder and Roberts, 2007). This current study may have been more conclusive if a physical activity only group was included. Involving a physical activity only group would confirm if physical activity acted as a 'gateway' for behavioural change or whether being involved in a multi-faceted health promotion programme caused the positive behavioural changes.

The retrospective aspect of this study is a weakness. The retrospective reporting of behaviour and stage of change was not validated for this study. There is also a possibility that people wanted to report behavioural changes, the CG made significant behaviour changes without making any significant movement through the stages of change for those behaviours. Movement through the stages should support increases in physical activity or healthy eating. As this movement through the stages of change is not demonstrated in the CG for any behaviour we could conclude that the CG was over-reporting their changes in behaviour due to wanting to become involved in the programme.

The general weakness of self-reporting, the small sample size and the change in season add to the overall weakness of the results. The weak evidence from this study may be strengthened in future interventions with the use of a prospective questionnaire.

8. CONCLUSION

In the current study all the groups modified their behaviour in either physical activity and/or diet over the six months. The health promotion group (HPG), which participated in the physical activity and nutrition component made positive changes in all behaviours unlike the nutritional group (NG), which received only the nutritional component of the intervention and the control group (CG), which did not participate in the health promotion programme. This provides some support for the hypothesis that physical exercise may act as a 'gateway' to other positive behavioural changes.

Past research has provided positive evidence for health promotion programmes increasing participants' physical activity (Proper et al., 2003) and that long term supervised exercise could be carried out at work, with support, encouragement and feedback (Pohjonen and Ranta, 2001). In the current study all groups reportedly increased their physical activity during the six month period, however the HPG significantly moved through the stages of change for physical activity, unlike the NG and CG. The retrospective aspect of the study may have allowed the NG and CG participants to suggest they were more physically active compared to 6 months ago; however this is not re-enforced by movement through the stages of change for physical activity. The HPG also increased their average physical activity to come close to the recommended daily physical activity (MOH, 2008), while the NG and CG did not. There is a possibility therefore that the 10,000 steps @ work 'lite' programme lead to the increased physical activity for the HPG.

Supportive work environments are paramount for successful nutritional programmes (Sorensen et al., 1998) and encouraging office workers to consume low-fat snacks may be achieved by providing nutritional information and providing low-fat alternatives in snack boxes and vending machines (Fiske and Cullen, 2004). The HPG and NG in the current study received nutritional information from a nutritional seminar ("Eating for Healthy NZ Adults" based on recommended food servings and information on sugars and fats) and weekly LiveSmart emails (tips on healthy eating). The HPG changed their dietary behaviours with an increase in fruit and vegetable intake and healthy snacking and the movement through the stages of change for these dietary behaviours. While the NG and CG did make some dietary

changes, neither group reported positive changes for all behaviours measured suggesting the involvement of HPG in the physical activity helped the HPG to make more positive changes in dietary behaviour.

Call centres are regarded as high stress environments and McMahon and Jason (1998) concluded those participants able to quit smoking indicated less stressful environments than those participants who could not quit. This current study revealed a high percentage of smokers compared to the national average (MOH, 2008). Over the intervention period the HPG demonstrated a movement through the stages of change towards quitting smoking compared to the other two groups. This would suggest that the HPG group were possibly motivated to make a change due to physical activity. Many barriers occur when trying to quit with one side effect being weight gain for some (Klesges et al., 1997) and many women find the experience of weight gain a possible reason to start smoking again. In this study 91 per cent of the participants were women and therefore physical activity may be used in the future as a vehicle to reduce weight gain and help change smoking behaviours (King et al., 2005). The high prevalence of smoking in this current study leads to the importance of incorporating the health risks of smoking into health promotion programmes, because smokers were more likely to drop out of their physical activity programme than non-smokers (Lippke et al., 2005). Multi-component health promotion programmes may be important to help individuals cease smoking and remain non-smokers (King et al., 1996).

Di Noia et al. (2008) observed the importance of transtheoretical-based interventions to increase fruit and vegetable consumption and although this current study did not allow for a tailored programme this could be a focus for the future using a computer based intervention. In a computer-based environment such as the Levin call centre any future computer-based interventions may be very successful if the participants are given time to look over the information on a daily or weekly basis.

8.1 Practical applications for the future

The effects of a health promotion programme in a work place environment should focus on the individual's needs in order to promote a positive behavioural change.

- Providing information to participants in precontemplation helps the movement into contemplation (Lach, 2004). Therefore providing the benefits of physical activity and nutrition to all participants, especially those individuals in the precontemplation stage raises consciousness and helps move individuals into the contemplation stage. The information given on healthy eating may have helped participants in the current study consider changing dietary behaviours.
- Providing information and tools to learn what they need to know to make changes, will help change behaviours to move individuals from contemplation to preparation (Lach, 2004). The free pedometer and involvement in the team 'virtual walk' competition, as well as the nutritional seminars during work time provided both the information as well as the tools to help make positive behavioural changes.
- Both long term and short term goal setting is important to move into preparation (Lach, 2004). The goal of 10,000 steps per day may have helped participants move through the stages of change rapidly towards action as well as providing a possible 'gateway' to changing other behaviours.
- Knowledge programmes help participants move into action (Lach, 2004) therefore giving weekly nutritional emails and the challenge of increasing their physical exercise using a pedometer will increase decisional balance and self-efficacy and move participants into to action. Specific skills for time management to increase exercise or increased nutritional awareness from an additional healthy food seminar will also help move participants into action in the future.
- Maintenance of a behaviour requires ongoing support and breaking down of barriers (Lach, 2004). If the employer provides time for exercise, as well as facilities such as showers and areas for bikes, the employees will feel supported in continuing to exercise. In this study the cost of fruit was a significant barrier to consumption, therefore providing a daily fruit "bowl" would help break down this barrier. In addition official company healthy

food policies and encouragement of team exercise would also support those participants in maintenance.

Multi-faceted health promotion programmes tailored to workers' stages of change and targeting both decisional balance and self-efficacy will be important for future health promotion at worksites. In this current study the HPG, which was involved in both the physical activity programme and the nutritional programme, consistently reported changes in behaviours, unlike the NG and CG. Therefore recommendations for future multi-faceted health promotion programmes in the work place should include: a physical activity component, which may be used as a 'gateway' to other behaviour changes; a nutritional component with in-depth information on healthy eating and provision for a daily fruit 'bowl' to encourage healthy snacking; and a smoking component with information on the consequences of smoking and how to change smoking behaviours.

Future research into such health promotion programmes should include prospective methodology and in-depth examination as to how physical activity may act as a 'gateway'.

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APPENDICES

Appendix 1: Introduction to the 10,000 steps @ work 'lite' programme and nutritional seminar/healthy emails powerpoint presentation

Objectives

- To increase health and activity levels in a team environment.

What's involved?

- 10,000 Steps Lite Program –Pedometers
- Seminars
- Weekly health and activity tips

10,000 Steps Lite Program

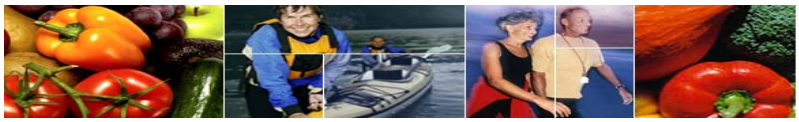
- Teams will combine their daily steps count to walk around New Zealand
- Million Steps

Seminars

- Activity and Sports Injury Seminar
- Nutritional Seminar

What will you gain?

- Regular physical activity
- Staying physically active
- Physical activity over time



Baseline Step Count

- Finding steps targets
- Each participant will be given a pedometer to wear for 4 days before the launch.
- Pedometers will be collected a day before the launch and individual steps targets given.

Have fun and enjoy walking for your health.

Appendix 2: Nutritional seminar powerpoint presentation

Physical Activity

Reaching your Steps Target Safely

- Build up slowly - don't increase more than 10-20% at a time
- Vary your exercise during the week e.g. bike ride or swim. Vary your walks
- Start slow when walking, once warm increase your intensity
- Use a good pair of walking shoes

Hydration

- Dehydration impairs physical and mental performance
- Start exercising hydrated
- Drink small amounts during exercise
- Increase intakes during hot or humid conditions
- After exercise replace 1.5 litres fluid/kg of body weight lost. (ACC 2005)

Stretching

- Safest time to stretch is after exercise
- Stretch slowly until tightening muscle felt
- Hold for 30 seconds
- Relax and breathe out as you move out of stretch
- Don't bounce & maintain correct posture/position
- Stretch both sides of your body (ACC, 2005)

In Case of Injury

RICE

- Rest, Ice (15 minutes),Compress, Elevate

Avoid HARM

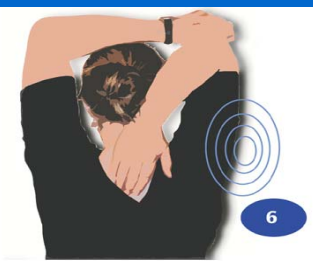
heat, alcohol, running, massage (ACC, 2005)

Report your injury immediately to your Health and Safety Officer

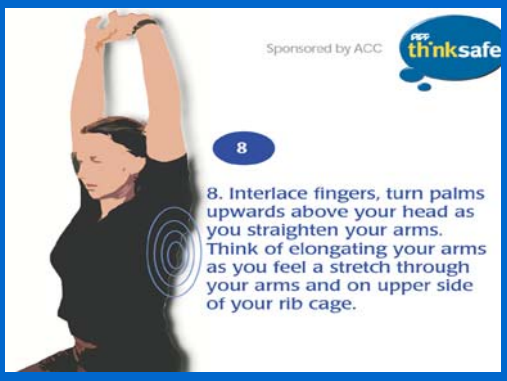
Work Exercises

- Reverse posture
- Every hour
- Areas of tension
- At least once a day.
- Relax
- Only hold stretches that feel good for you
- Micropauses

5. Keep your chin tucked in. With fingers interlaced behind your head, keep the elbows straight out to the side with the upper body in a good upright position. Now pull your shoulder blades towards each other. Lean over the back of your chair to extend your upper back.



6. Hold your right elbow with your left hand, then gently pull your elbow behind your head until an easy tension-stretch is felt in your shoulder or along the back of your upper arm.
(Repeat other side)



8. Interlace fingers, turn palms upwards above your head as you straighten your arms. Think of elongating your arms as you feel a stretch through your arms and on upper side of your rib cage.

Appendix 3: Nutritional seminar powerpoint presentation

Sugar and Fats and the Consequences for Your Health

Sugar – How does your body cope?

Glycaemic Index – ability of food to ↑ sugar in the blood

- **High GI** - digested quickly e. g. white bread and sweets ↑ insulin levels (Holt et al. 1997)
- **Low GI**- digested slowly e.g. fruit & vegetables, whole grain breads, oat and bran based cereals, salads ↓ insulin demand (Brand- Miller, 2005).

High GI foods and Low GI Foods

Glycaemic Index for different foods

• Coco Pops	77	Toasted Muesli	43
• Potato Crisps	57	Apple	32
• Mars Bar	62	Kiwifruit	47
• White Bread	71	Whole-grain Bread	51
• Coca Cola	53	Water	0
Total	**320**	**Total**	**173**

(Brand-Miller, 2005)

Effect of High Sugar Intake

↑ glycaemic load causes ↑ insulin demand

&

the ↑ chance of

type II diabetes and coronary heart disease (Liu,2002).

Effect of High Sugar Intake

↑ glycaemic load causes ↑ insulin demand

&

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type II diabetes and coronary heart disease (Liu,2002).

Part B: Fats

Fat is important! 3rd Major Nutrient

3 Main Groups of Fat

1. Saturated (max 10%)
2. Monounsaturated (20%)
3. Polyunsaturated (omega 6 & omega 3) (6-10%)

Fat Intakes

- Foods high in **Saturated fats** cause ↑ blood cholesterol levels
- Foods high in **Polyunsaturated fats** ↓ blood cholesterol levels (Mutanen, 1997)

Polyunsaturated Fats

Omega 6

Over-abundant in Western diets -vegetable oils used in processed and bakery products. Grain feed to animals.

Omega 3

Vegetable oils, green leafy vegetables, sardines, tuna, herring, mackerel (Newton, 1997) and salmon.

Why we need Omega 3?

Short Term Lack of Omega 3 causes:

- Skin damage
- Disturbances in growth
- Disturbances in hormonal balance
- Inflammatory reactions and immune system's defence (Newton, 1997)

Why we need Omega 3?

Long Term Lack of Omega 3 is linked to diseases e.g.

- Coronary heart disease
- High blood pressure
- Arthritis
- Asthma
- Cancer (Newton 1997)

Mediterranean Diet

- **Fruit & vegetables**
- **Foods high in Omega 3**
- **Monounsaturated fats** (extra virgin olive oil)
- **Low saturated fats**

Protects against coronary heart disease, ageing and some cancers (Owen et al., 2000)

Reading Food Labels

Arnott's Digestives with Fruit & Milk Chocolate

NUTRITIONAL INFORMATION
Servings per Package: about 6
Serving size: 35g

	Per Serving* (Approx. 2. Biscuits)	Per 100g*		Per Serving*	Per 100g
ENERGY	710kJ	2030kJ	CARBOHYDRATE		
PROTEIN	2.4g	6.9g	-TOTAL	22.0g	62.8g
FAT			**-SUGARS**	12.2g	34.8g
-TOTAL	7.8g	22.2g	SODIUM	85mg	240mg
-SATURATED	3.8g	11.0g			

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Appendix 4: Letter of invitation to take part in the programme

Institute of Food, Nutrition and Human Health

22 September 2005

Contact Energy
P O Box 282
LEVIN

Dear Sir/Madam

Invitation to take part in a Massey University Masters thesis study

My name is Nikki Hartshorn, I am undertaking a study as part of my Masters thesis. The aim of the study is to find out if exercise helps people establish a healthy diet and to stop smoking.

I have attached an information sheet, which give details of this study. If you are interested please sign the consent form and return in the self-addressed envelope supplied.

Thank you for your time.

Yours sincerely

Nicola Hartshorn

Appendix 5: Information sheet for the Health Promotion Group (HPG)

Institute of Food, Nutrition and Human Health

Measuring the Impact of participating in an activity program (10,000 Steps @ Work Lite Program) on diet and other health behaviours as measured through stages of change

My name is Nikki Hartshorn and I am studying for my Masters thesis. This project is a part of my MSc thesis. My supervisor for the project is Dr Janet Weber. I have been employed by Contact Energy to work in the pricing corrections team full time, with a small part of this time being allocated to run the health promotion program.

What is the study about?
This study aims to investigate whether exercise helps you introduce healthy habits into your life such as adhering to a healthy diet and stopping smoking.

A health promotion program that involved the 10,000 Steps @ work lite program and a nutritional seminar with weekly Cancer Society health tips, has been running in the call centre for the last 3 months. 32 staff have taken part in this program and another 30 staff have been involved solely in the nutritional seminar and the weekly Cancer Society health tips. All groups were randomly selected, including a non-participant group of 30 staff. In order to measure the impact of this program, two questionnaires will be given to all participants in the three groups. You have been selected to take part in this study as you have recently completed the 10,000 steps program and nutritional seminar with weekly Cancer Society health tips.

What is the process?
Your name has been randomly selected from a list of potential participants provided by Contact Energy. If after reading this document you are interested in participating, please complete the two questionnaires and return in the self addressed envelope. The research results will be presented by Dr Janet Weber by email after the study is completed.

How much of your time will this project take?
The two questionnaires each will take about 20 minutes of your time to complete and return. The completion and return of the questionnaire implies consent and you have the right to decline to answer any particular question. To protect your confidentiality the researcher will issue you with a code number. This code number is used rather than your name on the questionnaire. Your data will be confidential and your name will not be used in any publication of the research findings. All data will be held at Massey University for a period of 5 years, after this time this data will be disposed of by either Dr Janet Weber or Nikki Hartshorn.

Who has approved this project?
This project has been reviewed and approved by the Massey University Human Ethics Committee, Palmerston North Application 05/106. If you have any concerns about the ethics of this research, please contact Dr John G O'Neill, Chair, Massey University Campus Human Ethics Committee: PN telephone 06 350 5799 x 8635, email humanethicspn@massey.ac.nz.

What are your rights?
Even if you have given your consent to take part in this project, you have the right to withdraw at any time. Just let the researcher or supervisor know your intentions to withdraw.

Project Contacts
If you have any questions about this project, please do not hesitate to contact Nikki Hartshorn 06 367 5447, 027 636 8089 Email phil.nikki@paradise.net.nz or Dr Janet Weber Phone 06 350 4403 Email J.L.Weber@massey.ac.nz

Appendix 6: Information sheet for the Nutritional Group (NG)

Institute of Food, Nutrition and Human Health

Measuring the Impact of participating in an activity program (10,000 Steps @ Work Lite Program) on diet and other health behaviours as measured through stages of change

My name is Nikki Hartshorn and I am studying for my Masters thesis. This project is a part of my MSc thesis. My supervisor for the project is Dr Janet Weber. I have been employed by Contact Energy to work in the pricing corrections team full time, with a small part of this time being allocated to run the health promotion program.

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A health promotion program that involved the 10,000 Steps @ work lite program and a nutritional seminar with weekly Cancer Society health tips has been running in the call centre for the last 3 months. 32 staff have taken part in this program and another 30 staff have been involved solely in the nutritional seminar and the weekly Cancer Society health tips. All groups were randomly selected including a non-participant group of 30 staff. In order to measure the impact of this program two questionnaires will be given to all participants in the three groups. You have been selected to take part in this study as you have been a participant in the nutritional seminar and the weekly Cancer Society health tips.

What is the process?
Your name has been randomly selected from a list of potential participants provided by Contact Energy. If after reading this document you are interested in participating, please complete the questionnaires and return in the self-addressed envelope. The research results will be presented by Dr Janet Weber by email after the study is completed.

How much of your time will this project take?
The two questionnaires each will take about 20 minutes of your time to complete and return. The completion and return of the questionnaire implies consent and you have the right to decline to answer any particular question. To protect your confidentiality the researcher will issue you with a code number. This code number is used rather than your name on the questionnaire. Your data will be confidential and your name will not be used in any publication of the research findings. All data will be held at Massey University for a period of 5 years, after this time this data will be disposed of by either Dr Janet Weber or Nikki Hartshorn.

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Appendix 7: Information sheet for the Control Group (CG)

Institute of Food, Nutrition and Human Health

Measuring the Impact of participating in an activity program (10,000 Steps @ Work Lite Program) on diet and other health behaviours as measured through stages of change

My name is Nikki Hartshorn and I am studying for my Masters thesis. This project is a part of my MSc thesis. My supervisor for the project is Dr Janet Weber. I have been employed by Contact Energy to work in the pricing corrections team full time, with a small part of this time being allocated to run the health promotion program.

What is the study about?
This study aims to investigate whether exercise helps you introduce healthy habits into your life such as adhering to a healthy diet and stopping smoking.

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What is the process?
Your name has been randomly selected from a list of potential participants provided by Contact Energy. If after reading this document you are interested in participating, please complete the questionnaires and return in the self-addressed envelope. The research results will be presented by Dr Janet Weber by email after the study is completed.

How much of your time will this project take?
The two questionnaires each will take about 20 minutes of your time to complete and return. The completion and return of the questionnaire implies consent and you have the right to decline to answer any particular question. To protect your confidentiality the researcher will issue you with a code number. This code number is used rather than your name on the questionnaire. Your data will be confidential and your name will not be used in any publication of the research findings. All data will be held at Massey University for a period of 5 years, after this time this data will be disposed of by either Dr Janet Weber or Nikki Hartshorn.

Who has approved this project?
This project has been reviewed and approved by the Massey University Human Ethics Committee, Palmerston North Application 05/106. If you have any concerns about the ethics of this research, please contact Dr John G O'Neill, Chair, Massey University Campus Human Ethics Committee: PN telephone 06 350 5799 x 8635, email humanethicspn@massey.ac.nz.

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Even if you have given your consent to take part in this project, you have the right to withdraw at any time. Just let the researcher or supervisor know your intentions to withdraw.

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Appendix 8: Questionnaire for HPG

Institute of Food, Nutrition and Human Health

Your Diet and Physical Activity

Thank you for agreeing to participate in this study about what you eat and your physical activity. In this first part of the questionnaire we are interested in what you were doing *6 months* ago in May, including your daily activity, what you ate and other health behaviours.

Do not put your name on this survey it is anonymous.

(*Completion and return of the questionnaire implies consent)*

Part 1

Q.1 ***Thinking back 6 months ago,*** **how would you describe your fitness?** *(Please give **one** answer only)*

☐ Extremely fit

☐ Moderately fit

☐ Moderately unfit

☐ Unfit

PHYSICAL ACTIVITY

The following questions ask about your physical activity 6 months ago.

Q.2 ***Thinking back 6 months ago,*** **approximately how often were you doing 15 minutes or more of vigorous activity or 30 minutes or more of moderate activity such as brisk walking?**

_____ Days per week ☐ None

Q.3 **Approximately how many daily steps were you taking at the start of the 10,000 steps program?_____**

Q.4 ***Thinking back 6 months*** **ago, what were your thoughts on becoming more physically active?** *(Please give **one** answer only)*

- ☐ Not thinking about becoming more physically active
- ☐ Thinking about becoming more physically active in the next 6 months
- ☐ About to become more physically active
- ☐ Had become more physically active in the last month
- ☐ I was sufficiently physically active already and continued this level of activity

SNACKS

The following questions ask what snacks you may have been eating 6 months ago.

Q.5 ***Thinking back 6 months*** **ago, approximately how often did you have the following foods and drinks as snacks?**

	Never	Less than once a month	1-3 times per month	Once per week	2-4 times per week	5-6 times per week	Once per day	2 or more times per day
Chippies								
Biscuits/Cake								
Muffin/Scone								
Tea/Coffee								
Sweets/Chocolate								
Sandwich								
Pie								
Carrot Sticks								
Muesli Bar								
Fruit								
Energy Drink								
Fizzy Drink								
Fruit Juice								
Water								

Q.6 **What other foods did you have for snacks regularly (5 or more times per week)?**_____
_____
_____

Q.7 ***Thinking back 6 months ago,*** **what were your thoughts on eating healthy snacks more often?** *(Please give **one** answer only)*

- ☐ Not thinking about eating healthy snacks more often
- ☐ Thinking about eating healthy snacks more often in next 6 months
- ☐ About to start eating healthy snacks more often
- ☐ Had started eating healthy snacks more often in the last month
- ☐ I was already eating healthy snacks most of the time

FRUIT AND VEGETABLES

The following questions ask about what fruit and vegetables you may have been eating 6 months ago.

Q.8 ***Thinking back 6 months ago,*** **on average how many servings of fruit (fresh, frozen, canned or stewed) did you eat per day? Do not include fruit juice or dried fruit.** ***(****Please give **one** answer only****)*** **A 'serving' = 1 medium piece or 2 small pieces of fruit or 1/2 cup of stewed fruit.**
e.g. 1 apple + 2 small apricots = 2 servings.

- ☐ I don't eat fruit
- ☐ Less than 1 serving per day
- ☐ 1 serving per day
- ☐ 2 servings per day
- ☐ 3 servings per day
- ☐ 4 or more servings per day

Q.9 ***Thinking back 6 months ago,*** **what were your thoughts on eating 2 servings of fruit per day?** *(Please give **one** answer only)*

- ☐ Not thinking about eating 2 servings of fruit per day
- ☐ Thinking about starting to eat 2 servings of fruit per day in the next 6 months
- ☐ About to start eating 2 servings of fruit per day
- ☐ Had started eating 2 servings of fruit per day in the last month
- ☐ I was already eating 2 + servings of fruit per day

Q.10 ***Thinking back 6 months ago*, on average how many servings of vegetables (fresh, frozen, and canned) did you eat a day? Do not include vegetable juices** (*Please give **one** answer only*)
A **'serving'** = 1 medium potato/kumara **or** 1/2 cup cooked vegetables **or** 1 cup of salad vegetables.
e.g. 2 medium potatoes + 1/2 cup of peas = 3 servings.

- ☐ I don't eat vegetables
- ☐ Less than 1 serving per day
- ☐ 1 serving per day
- ☐ 2 servings per day
- ☐ 3 servings per day
- ☐ 4 or more servings per day

Q.11 ***Thinking back 6 months ago*, what were your thoughts on eating 3 servings of vegetables per day?** *(Please give **one** answer only)*

- ☐ Not thinking about eating 3 servings of vegetables per day
- ☐ Thinking about starting to eat 3 servings of vegetables per day in the next 6 months
- ☐ About to start eating 3 servings of vegetables per day
- ☐ Had started eating 3 servings of vegetables per day in the last month
- ☐ I was already eating 3 + servings of vegetables per day

SMOKING

Q.12 ***Thinking back 6 months*, ago did you smoke?**

- ☐ No Go to question 14
- ☐ Yes Go to question 13

Q.13 ***Thinking back 6 months ago*, what were your thoughts about cutting down on smoking?** *(Please give **one** answer only)*

- ☐ Not thinking about cutting down on smoking
- ☐ Thinking about starting to cut down on smoking in the next 6 months
- ☐ About to start cutting down on smoking
- ☐ Had started to cut down on smoking in the last month
- ☐ I had already cut down on smoking and continued at this level

GENERAL HEALTH

Q.14 **In general, how would you say that your health was *6 months ago*?** *(Please give **one** answer only)*

☐ Excellent ☐ Fair

☐ Very good ☐ Poor

☐ Good

Part 2

Thinking about the present

Q.15 **How would you describe your current fitness?** *(Please give **one** answer only)*

☐ Extremely fit

☐ Moderately fit

☐ Moderately unfit

☐ Unfit

Q.16 ***Currently*, how often are you doing 15 minutes or more of vigorous activity or 30 minutes or more of moderate activity such as brisk walking?**

____ Days per week ☐ None

Q.17 **How many daily steps were you taking at the end of the 10,000 steps program?_____**

Q.18 ***Currently*, what are your thoughts on becoming more physically active?** *(Please give **one** answer only)*

☐ Not thinking about becoming more physically active

☐ Thinking about becoming more physically active in the next 6 months

☐ About to become more physically active in the next month

☐ Have become more physically active in the last month

☐ I am sufficiently physically active already and will continue this level of activity

Q.19 **If you have made a change in your physical activity in the last 6 months, what change have you made and why have you made this change?**_____
_____
_____

SNACKS

The following questions ask what snacks you are eating currently.

Q.20 **How often do you have the following foods and drinks as snacks?**

	Never	Less than once a month	1-3 times per month	Once per week	2-4 times per week	5-6 times per week	Once per day	2 or more times per day
Chippies								
Biscuits/Cake								
Muffin/Scone								
Tea/Coffee								
Sweets/Chocolate								
Sandwich								
Pie								
Carrot Sticks								
Muesli Bar								
Fruit								
Energy Drink								
Fizzy Drink								
Fruit Juice								
Water								

Q.21 **What other foods do you have for snacks regularly (5 or more times per week)?**_____
_____
_____

Q.22 **What type of snacks do you regard as healthy snacks?**_____
_____
_____

Q.23 ***Currently*, what are your thoughts on eating healthy snacks more often**?
*(Please give **one** answer only)*

- ☐ Not thinking about eating healthy snacks more often
- ☐ Thinking about eating healthy snacks more often in the next 6 months
- ☐ About to start eating healthy snacks more often in the next month
- ☐ Have started eating healthy snacks more often in the last month
- ☐ I am already eating healthy snacks most of the time

Q.24 **If you have made a change in your snacks and drinks the last 6 months, what change have you made and why have you made this change?**_____

Q.25 **Read each of the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
Healthy snacks are cheap to buy	☐	☐	☐	☐	☐
Eating healthy snacks gives a person more vitamins and minerals than if they eat other snacks	☐	☐	☐	☐	☐
Eating healthy snacks is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating healthy snacks	☐	☐	☐	☐	☐
I enjoy the taste of most healthy snacks	☐	☐	☐	☐	☐
It's worthwhile to spend extra money on healthy snacks	☐	☐	☐	☐	☐
People who eat healthy snacks look healthier	☐	☐	☐	☐	☐
Healthy snacks are important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Healthy snacks don't keep me going during the day	☐	☐	☐	☐	☐
I don't like the taste of healthy snacks	☐	☐	☐	☐	☐
It is often difficult to find healthy snacks	☐	☐	☐	☐	☐
Healthy snacks are a hassle to prepare	☐	☐	☐	☐	☐

Q.26 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can buy healthy snacks for morning and afternoon tea	☐	☐	☐	☐	☐
I can include healthy snacks when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can buy healthy snacks when I am out with friends	☐	☐	☐	☐	☐
I can include healthy snacks each day while on holiday	☐	☐	☐	☐	☐
I can include healthy snacks when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I know how to choose healthy snacks	☐	☐	☐	☐	☐

FRUIT AND VEGETABLES

The following questions ask about your current fruit and vegetable consumption.

Q.27 ***Currently*** **on average how many servings of fruit (fresh, frozen, canned or stewed) do you eat per day? Do not include fruit juice or dried fruit.** *(Please give **one** answer only)*

A **'serving'** = 1 medium piece **or** 2 small pieces of fruit **or** 1/2 cup of stewed fruit.
e.g. 1 apple + 2 small apricots = 2 servings.

☐ I don't eat fruit
☐ Less than 1 serving per day
☐ 1 serving per day
☐ 2 servings per day
☐ 3 servings per day
☐ 4 or more servings per day

Q.28 ***Currently*****, what are your thoughts about eating 2 servings of fruit per day?** *(Please give **one** answer only)*

☐ Not thinking about eating 2 servings of fruit per day
☐ Thinking about starting to eat 2 servings of fruit per day in the next 6 months
☐ About to start eating 2 servings of fruit per day in the next month
☐ Have started eating 2 servings of fruit per day in the last month
☐ I am already eating 2 + servings of fruit per day

Q.29 **If you have made a change in your fruit consumption in the last 6 months, what change have you made and why have you made this change?**

_____
_____
_____

Q.30 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
Fruit is cheap to buy	☐	☐	☐	☐	☐
Eating 2 + servings of fruit per day would give me plenty of vitamins and minerals	☐	☐	☐	☐	☐
Eating fruit would help me "cleanse" my body	☐	☐	☐	☐	☐
Eating fruit is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating 2 + servings of fruit per day	☐	☐	☐	☐	☐
I enjoy the taste of most fruit	☐	☐	☐	☐	☐
Eating 2 + servings of fruit per day would mean that I'm less likely to get cancer	☐	☐	☐	☐	☐
People who eat plenty of fruit look healthier	☐	☐	☐	☐	☐
I feel I would be over eating if I ate 2 + servings of fruit per day	☐	☐	☐	☐	☐
Fruit is important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Fruit is a quick and easy snack	☐	☐	☐	☐	☐
Ordering fruit when I eat out doesn't give me value for money	☐	☐	☐	☐	☐
I would worry about pesticides if I ate 2 or more pieces of fruit per day	☐	☐	☐	☐	☐
I get a bad reaction if I eat more of certain fruit	☐	☐	☐	☐	☐
I don't like the taste and/or texture of most fruit	☐	☐	☐	☐	☐
It's worthwhile spending extra money on fruit	☐	☐	☐	☐	☐
Fruit is not sweet enough	☐	☐	☐	☐	☐
Fruit does not store well	☐	☐	☐	☐	☐

Q.31 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can include fruit in my evening meal when I eat at home	☐	☐	☐	☐	☐
I can include fruit as part of a snack, most of the time	☐	☐	☐	☐	☐
I can include fruit when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can eat fruit when out with friends and want a snack	☐	☐	☐	☐	☐
I can include fruit each day while on holiday	☐	☐	☐	☐	☐
I can buy fruit most of the time when out for lunch	☐	☐	☐	☐	☐
I can include fruit for breakfast in the morning, most of the time	☐	☐	☐	☐	☐
I can include fruit when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I can order fruit when I'm out for dinner	☐	☐	☐	☐	☐

Q.32 ***Currently*** **how many servings of vegetables (fresh, frozen, canned) do you eat a day? Do not include vegetable juices.** *(Please give **one** answer only)*
A **'serving'** = 1 medium potato/kumara **or** ½ cup cooked vegetables **or** 1 cup of salad vegetables **e.g.** 2 medium potatoes + ½ cup of peas = 3 servings.

☐ I don't eat vegetables
☐ Less than 1 serving per day
☐ 1 serving per day
☐ 2 servings per day
☐ 3 servings per day
☐ 4 or more servings per day

Q.33 ***Currently*****, what are your thoughts about eating 3 servings of vegetables per day?** *(Please give **one** answer only)*

☐ Not thinking about eating 3 servings of vegetables per day
☐ Thinking about starting to eat 3 servings of vegetables per day in the next 6 months
☐ About to start eating 3 servings of vegetables per day in the next month
☐ Have started eating 3 servings of vegetables per day in the last month
☐ I am already eating 3 + servings of vegetables per day

Q.34 **If you have made a change in your vegetable consumption in the last 6 months, what change have you made and why have you made this change**?_____
_____
_____

Q.35 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**Strongly disagree**
Vegetables are cheap to buy	☐	☐	☐	☐	☐
Eating 3 + servings of vegetables per day would give me plenty of vitamins and minerals	☐	☐	☐	☐	☐
Eating vegetables would help me "cleanse" my body	☐	☐	☐	☐	☐
Eating vegetables is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating 3 + vegetables per day	☐	☐	☐	☐	☐
I enjoy the taste of most vegetables	☐	☐	☐	☐	☐
Eating 3 + servings of vegetables per day would mean that I'm less likely to get cancer	☐	☐	☐	☐	☐
People who eat plenty of vegetables look healthier	☐	☐	☐	☐	☐
I feel I would be over eating if I ate 3 + servings of vegetables per day	☐	☐	☐	☐	☐
Vegetables are important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Vegetables are a quick and easy snack	☐	☐	☐	☐	☐
Ordering vegetables when I eat out doesn't give me value for money	☐	☐	☐	☐	☐
I would worry about pesticides if I ate 3 or more servings of vegetables per day	☐	☐	☐	☐	☐
I get a bad reaction if I eat more of certain vegetables	☐	☐	☐	☐	☐
I don't like the taste and/or texture of vegetables	☐	☐	☐	☐	☐
It's worthwhile spending extra money on vegetables	☐	☐	☐	☐	☐
Preparing and cooking vegetables is time consuming	☐	☐	☐	☐	☐
Vegetables don't store well	☐	☐	☐	☐	☐

Q.36 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can include vegetables with my evening meal when I eat at home	☐	☐	☐	☐	☐
I can include vegetables as part of a snack, most of the time	☐	☐	☐	☐	☐
I can include vegetables when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can eat vegetables when out with friends and want a snack	☐	☐	☐	☐	☐
I can include vegetables each day while on holiday	☐	☐	☐	☐	☐
I can buy vegetables most of the time when out for lunch	☐	☐	☐	☐	☐
I can include vegetables when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I can order vegetables when out for dinner	☐	☐	☐	☐	☐

SMOKING

Q.37 **Do you currently smoke?**

☐ No Go to question 40

☐ Yes Go to question 38

Q.38 ***Currently*, what are your thoughts about cutting down on smoking?** *(Please give **one** answer only)*

☐ Not thinking about cutting down on smoking

☐ Thinking about starting to cut down on smoking in the next 6 months

☐ About to start cutting down on smoking in the next month

☐ Have started to cut down on smoking in the last month

☐ I cut down on my smoking within the last 6 months and will continue at this level

Q.39 If you have cut down on smoking, what motivated you to cut down?

_____

_____

_____

Q.40 **In general, how would you say that your health is currently?**

☐ Excellent ☐ Fair

☐ Very good ☐ Poor

☐ Good

DEMOGRAPHICS

Please answer the following questions to describe yourself.

Q.41 **Gender**

☐ Male ☐ Female

Q.42 **Age**

☐ Between 18-25

☐ Between 26-35

☐ Between 36-45

☐ Between 46-55

☐ Between 56-65

Thank you for completing this questionnaire. Please put it into the envelope supplied and post to Dr Janet Weber, Institute of Food Nutrition & Human Health, Massey University, Private Bag 11222, PALMERSTON NORTH.

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Appendix 9: Questionnaire for NG and CG

Institute of Food, Nutrition and Human Health

Your Diet and Physical Activity

Thank you for agreeing to participate in this study about what you eat and your physical activity. In this first part of the questionnaire we are interested in what you were doing *6 months* ago in May, including your daily activity, what you ate and other health behaviours.

Do not put your name on this survey it is anonymous.
(*Completion and return of the questionnaire implies consent)*

Part 1

Q.1 *Thinking back 6 months ago*, how would you describe your fitness? ***(Please give** one **answer only)***

☐ Extremely fit

☐ Moderately fit

☐ Moderately unfit

☐ Unfit

PHYSICAL ACTIVITY
The following questions ask about your physical activity 6 months ago.

Q.2 ***Thinking back 6 months ago,*** **approximately how often were you doing 15 minutes or more of vigorous activity or 30 minutes or more of moderate activity such as brisk walking?**

____ Days per week ☐ None

Q.3 *Thinking back 6 months* ago, what were your thoughts on becoming more physically active? ***(Please give** one **answer only)***

☐ Not thinking about becoming more physically active

☐ Thinking about becoming more physically active in the next 6 months

☐ About to become more physically active

☐ Had become more physically active in the last month

☐ I was sufficiently physically active already and continued this level of activity

SNACKS

The following questions ask what snacks you may have been eating 6 months ago.

Q.4 ***Thinking back 6 months*** **ago, approximately how often did you have the following foods and drinks as snacks?**

	Never	Less than once a month	1-3 times per month	Once per week	2-4 times per week	5-6 times per week	Once per day	2 or more times per day
Chippies								
Biscuits/Cake								
Muffin/Scone								
Tea/Coffee								
Sweets/Chocolate								
Sandwich								
Pie								
Carrot Sticks								
Muesli Bar								
Fruit								
Energy Drink								
Fizzy Drink								
Fruit Juice								
Water								

Q.5 **What other foods did you have for snacks regularly (5 or more times per week)?**_____
_____
_____

Q.6 *Thinking back 6 months ago*, what were your thoughts on eating healthy snacks more often? ***(Please give*** *one* ***answer only)***

- ☐ Not thinking about eating healthy snacks more often
- ☐ Thinking about eating healthy snacks more often in next 6 months
- ☐ About to start eating healthy snacks more often
- ☐ Had started eating healthy snacks more often in the last month
- ☐ I was already eating healthy snacks most of the time

FRUIT AND VEGETABLES

The following questions ask about what fruit and vegetables you may have been eating 6 months ago.

Q.7 *Thinking back 6 months ago*, on average how many servings of fruit (fresh, frozen, canned or stewed) did you eat per day? Do not include fruit juice or dried fruit. ***(Please give** one **answer only)*** A 'serving' = 1 medium piece or 2 small pieces of fruit or 1/2 cup of stewed fruit.
e.g. 1 apple + 2 small apricots = 2 servings.

- ☐ I don't eat fruit
- ☐ Less than 1 serving per day
- ☐ 1 serving per day
- ☐ 2 servings per day
- ☐ 3 servings per day
- ☐ 4 or more servings per day

Q.8 *Thinking back 6 months ago*, what were your thoughts on eating 2 servings of fruit per day? ***(Please give** one **answer only)***

- ☐ Not thinking about eating 2 servings of fruit per day
- ☐ Thinking about starting to eat 2 servings of fruit per day in the next 6 months
- ☐ About to start eating 2 servings of fruit per day
- ☐ Had started eating 2 servings of fruit per day in the last month
- ☐ I was already eating 2 + servings of fruit per day

Q.9 ***Thinking back 6 months ago*, on average how many servings of vegetables (fresh, frozen, and canned) did you eat a day? Do not include vegetable juices** (*Please give **one** answer only*)
A **'serving'** = 1 medium potato/kumara **or** 1/2 cup cooked vegetables **or** 1 cup of salad vegetables.
e.g. 2 medium potatoes + 1/2 cup of peas = 3 servings.

- ☐ I don't eat vegetables
- ☐ Less than 1 serving per day
- ☐ 1 serving per day
- ☐ 2 servings per day
- ☐ 3 servings per day
- ☐ 4 or more servings per day

Q.10 *Thinking back 6 months ago*, what were your thoughts on eating 3 servings of vegetables per day? ***(Please give** one **answer only)***

- ☐ Not thinking about eating 3 servings of vegetables per day
- ☐ Thinking about starting to eat 3 servings of vegetables per day in the next 6 months
- ☐ About to start eating 3 servings of vegetables per day
- ☐ Had started eating 3 servings of vegetables per day in the last month
- ☐ I was already eating 3 + servings of vegetables per day

SMOKING

Q.11 ***Thinking back 6 months*, ago did you smoke?**

☐ No Go to question 13

☐ Yes Go to question 12

Q.12 ***Thinking back 6 months ago,* what were your thoughts about cutting down on smoking?** *(Please give **one** answer only)*

☐ Not thinking about cutting down on smoking

☐ Thinking about starting to cut down on smoking in the next 6 months

☐ About to start cutting down on smoking

☐ Had started to cut down on smoking in the last month

☐ I had already cut down on smoking and continued at this level

GENERAL HEALTH

Q.13 **In general, how would you say that your health was *6 months ago*?** *(Please give **one** answer only)*

☐ Excellent ☐ Fair

☐ Very good ☐ Poor

☐ Good

Part 2

Thinking about the present

Q.**14** How would you describe your current fitness? ***(Please give** one **answer only)***

☐ Extremely fit

☐ Moderately fit

☐ Moderately unfit

☐ Unfit

Q.15 ***Currently,* how often are you doing 15 minutes or more of vigorous activity or 30 minutes or more of moderate activity such as brisk walking?**

____ Days per week ☐ None

Q.16 *Currently*, what are your thoughts on becoming more physically active? ***(Please give** one **answer only)***

- ☐ Not thinking about becoming more physically active
- ☐ Thinking about becoming more physically active in the next 6 months
- ☐ About to become more physically active in the next month
- ☐ Have become more physically active in the last month
- ☐ I am sufficiently physically active already and will continue this level of activity

Q.17 **If you have made a change in your physical activity in the last 6 months, what change have you made and why have you made this change?**_____
_____
_____

SNACKS

The following questions ask what snacks you are eating currently.

Q.18 **How often do you have the following foods and drinks as snacks?**

	Never	Less than once a month	1-3 times per month	Once per week	2-4 times per week	5-6 times per week	Once per day	2 or more times per day
Chippies								
Biscuits/Cake								
Muffin/Scone								
Tea/Coffee								
Sweets/Chocolate								
Sandwich								
Pie								
Carrot Sticks								
Muesli Bar								
Fruit								
Energy Drink								
Fizzy Drink								
Fruit Juice								
Water								

Q.19 **What other foods do you have for snacks regularly (5 or more times per week)?**_____
_____
_____

Q.20 **What type of snacks do you regard as healthy snacks?**_____
_____
_____

Q.21 *Currently*, what are your thoughts on eating healthy snacks more often**?** ***(Please give** one **answer only)***

☐ Not thinking about eating healthy snacks more often

☐ Thinking about eating healthy snacks more often in the next 6 months

☐ About to start eating healthy snacks more often in the next month

☐ Have started eating healthy snacks more often in the last month

☐ I am already eating healthy snacks most of the time

Q.22 **If you have made a change in your snacks and drinks the last 6 months, what change have you made and why have you made this change?**_____
_____
_____

Q.23 **Read each of the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
Healthy snacks are cheap to buy	☐	☐	☐	☐	☐
Eating healthy snacks gives a person more vitamins and minerals than if they eat other snacks	☐	☐	☐	☐	☐
Eating healthy snacks is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating healthy snacks	☐	☐	☐	☐	☐
I enjoy the taste of most healthy snacks	☐	☐	☐	☐	☐
It's worthwhile to spend extra money on healthy snacks	☐	☐	☐	☐	☐
People who eat healthy snacks look healthier	☐	☐	☐	☐	☐
Healthy snacks are important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Healthy snacks don't keep me going during the day	☐	☐	☐	☐	☐
I don't like the taste of healthy snacks	☐	☐	☐	☐	☐
It is often difficult to find healthy snacks	☐	☐	☐	☐	☐
Healthy snacks are a hassle to prepare	☐	☐	☐	☐	☐

Q.24 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can buy healthy snacks for morning and afternoon tea	☐	☐	☐	☐	☐
I can include healthy snacks when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can buy healthy snacks when I am out with friends	☐	☐	☐	☐	☐
I can include healthy snacks each day while on holiday	☐	☐	☐	☐	☐
I can include healthy snacks when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I know how to choose healthy snacks	☐	☐	☐	☐	☐

FRUIT AND VEGETABLES

The following questions ask about your current fruit and vegetable consumption.

Q.25 *Currently* on average how many servings of fruit (fresh, frozen, canned or stewed) do you eat per day? Do not include fruit juice or dried fruit. ***(Please give** one **answer only)***

A **'serving'** = 1 medium piece **or** 2 small pieces of fruit **or** 1/2 cup of stewed fruit.
e.g. 1 apple + 2 small apricots = 2 servings.

☐ I don't eat fruit
☐ Less than 1 serving per day
☐ 1 serving per day
☐ 2 servings per day
☐ 3 servings per day
☐ 4 or more servings per day

Q.26 *Currently*, what are your thoughts about eating 2 servings of fruit per day? ***(Please give** one **answer only)***

☐ Not thinking about eating 2 servings of fruit per day
☐ Thinking about starting to eat 2 servings of fruit per day in the next 6 months
☐ About to start eating 2 servings of fruit per day in the next month
☐ Have started eating 2 servings of fruit per day in the last month
I am already eating 2 + servings of fruit per day

Q.27 **If you have made a change in your fruit consumption in the last 6 months, what change have you made and why have you made this change?**_____
_____
_____

Q.28 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
Fruit is cheap to buy	☐	☐	☐	☐	☐
Eating 2 + servings of fruit per day would give me plenty of vitamins and minerals	☐	☐	☐	☐	☐
Eating fruit would help me “cleanse” my body	☐	☐	☐	☐	☐
Eating fruit is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating 2 + servings of fruit per day	☐	☐	☐	☐	☐
I enjoy the taste of most fruit	☐	☐	☐	☐	☐
Eating 2 + servings of fruit per day would mean that I’m less likely to get cancer	☐	☐	☐	☐	☐
People who eat plenty of fruit look healthier	☐	☐	☐	☐	☐
I feel I would be over eating if I ate 2 + servings of fruit per day	☐	☐	☐	☐	☐
Fruit is important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Fruit is a quick and easy snack	☐	☐	☐	☐	☐
Ordering fruit when I eat out doesn’t give me value for money	☐	☐	☐	☐	☐
I would worry about pesticides if I ate 2 or more pieces of fruit per day	☐	☐	☐	☐	☐
I get a bad reaction if I eat more of certain fruit	☐	☐	☐	☐	☐
I don’t like the taste and/or texture of most fruit	☐	☐	☐	☐	☐
It’s worthwhile spending extra money on fruit	☐	☐	☐	☐	☐
Fruit is not sweet enough	☐	☐	☐	☐	☐
Fruit does not store well	☐	☐	☐	☐	☐

Q.29 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can include fruit in my evening meal when I eat at home	☐	☐	☐	☐	☐
I can include fruit as part of a snack, most of the time	☐	☐	☐	☐	☐
I can include fruit when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can eat fruit when out with friends and want a snack	☐	☐	☐	☐	☐
I can include fruit each day while on holiday	☐	☐	☐	☐	☐
I can buy fruit most of the time when out for lunch	☐	☐	☐	☐	☐
I can include fruit for breakfast in the morning, most of the time	☐	☐	☐	☐	☐
I can include fruit when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I can order fruit when I'm out for dinner	☐	☐	☐	☐	☐

Q.30 ***Currently*** **how many servings of vegetables (fresh, frozen, canned) do you eat a day? Do not include vegetable juices.** *(Please give **one** answer only)*
A **'serving'** = 1 medium potato/kumara **or** ½ cup cooked vegetables **or** 1 cup of salad vegetables **e.g.** 2 medium potatoes + ½ cup of peas = 3 servings.

☐ I don't eat vegetables
☐ Less than 1 serving per day
☐ 1 serving per day
☐ 2 servings per day
☐ 3 servings per day
☐ 4 or more servings per day

Q.31 ***Currently*****, what are your thoughts about eating 3 servings of vegetables per day?** *(Please give **one** answer only)*

☐ Not thinking about eating 3 servings of vegetables per day
☐ Thinking about starting to eat 3 servings of vegetables per day in the next 6 months
☐ About to start eating 3 servings of vegetables per day in the next month
☐ Have started eating 3 servings of vegetables per day in the last month
☐ I am already eating 3 + servings of vegetables per day

Q.32 **If you have made a change in your vegetable consumption in the last 6 months, what change have you made and why have you made this change**?_____
_____
_____
_____

Q.33 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**Strongly disagree**
Vegetables are cheap to buy	☐	☐	☐	☐	☐
Eating 3 + servings of vegetables per day would give me plenty of vitamins and minerals	☐	☐	☐	☐	☐
Eating vegetables would help me “cleanse” my body	☐	☐	☐	☐	☐
Eating vegetables is a way to cut down calories	☐	☐	☐	☐	☐
I would feel good about looking after my health by eating 3 + vegetables per day	☐	☐	☐	☐	☐
I enjoy the taste of most vegetables	☐	☐	☐	☐	☐
Eating 3 + servings of vegetables per day would mean that I’m less likely to get cancer	☐	☐	☐	☐	☐
People who eat plenty of vegetables look healthier	☐	☐	☐	☐	☐
I feel I would be over eating if I ate 3 + servings of vegetables per day	☐	☐	☐	☐	☐
Vegetables are important in relation to enjoying physical exercise	☐	☐	☐	☐	☐
Vegetables are a quick and easy snack	☐	☐	☐	☐	☐
Ordering vegetables when I eat out doesn’t give me value for money	☐	☐	☐	☐	☐
I would worry about pesticides if I ate 3 or more servings of vegetables per day	☐	☐	☐	☐	☐
I get a bad reaction if I eat more of certain vegetables	☐	☐	☐	☐	☐
I don’t like the taste and/or texture of vegetables	☐	☐	☐	☐	☐
It’s worthwhile spending extra money on vegetables	☐	☐	☐	☐	☐
Preparing and cooking vegetables is time consuming	☐	☐	☐	☐	☐
Vegetables don’t store well	☐	☐	☐	☐	☐

Q.34 **Please read the following statements and indicate if you agree or disagree by ticking the box.**

	strongly agree	**Agree**	**neither agree nor disagree**	**disagree**	**strongly disagree**
I can include vegetables with my evening meal when I eat at home	☐	☐	☐	☐	☐
I can include vegetables as part of a snack, most of the time	☐	☐	☐	☐	☐
I can include vegetables when I pack my lunch, most of the time	☐	☐	☐	☐	☐
I can eat vegetables when out with friends and want a snack	☐	☐	☐	☐	☐
I can include vegetables each day while on holiday	☐	☐	☐	☐	☐
I can buy vegetables most of the time when out for lunch	☐	☐	☐	☐	☐
I can include vegetables when on a picnic and I am packing the food	☐	☐	☐	☐	☐
I can order vegetables when out for dinner	☐	☐	☐	☐	☐

SMOKING

Q.35 **Do you currently smoke?**

☐ No Go to question 38

☐ Yes Go to question 36

Q.36 ***Currently*, what are your thoughts about cutting down on smoking?** *(Please give **one** answer only)*

☐ Not thinking about cutting down on smoking

☐ Thinking about starting to cut down on smoking in the next 6 months

☐ About to start cutting down on smoking in the next month

☐ Have started to cut down on smoking in the last month

I cut down on my smoking within the last 6 months and will continue at this level

Q.37 If you have cut down on smoking, what motivated you to cut down?

_____

_____

_____

Q.38 **In general, how would you say that your health is currently?**

☐ Excellent ☐ Fair

☐ Very good ☐ Poor

☐ Good

DEMOGRAPHICS

Please answer the following questions to describe yourself.

Q.39 **Gender**

☐ Male ☐ Female

Q.40 **Age**

☐ Between 18-25

☐ Between 26-35

☐ Between 36-45

☐ Between 46-55

☐ Between 56-65

Thank you for completing this questionnaire. Please put it into the envelope supplied and post to Dr Janet Weber, Institute of Food Nutrition & Human Health, Massey University, Private Bag 11222, PALMERSTON NORTH.

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