

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.



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

A thesis presented in partial fulfillment of the requirements for the degree of  
Master of Science in Nutritional Science  
at Massey University, Palmerston North, New Zealand.

Nikki Hartshorn

2009



## **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.

## **ACKNOWLEDGEMENTS**

Acknowledgements go to the staff and management at Contact Energy Levin Call Centre site for their participation and support. Thanks to Joanne McKirdy and Contact Energy for providing the finance, time and support to carry out this research on site.

Thanks to Janet Weber for her valuable guidance and time as a supervisor of this study. I would also like to show my gratitude to Heather Mourdant for her input and encouragement at the beginning of the study and to Patrick Morel for his help with the statistics and statistical programmes.

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

**CONTENTS**

	<b>Page</b>
Abstract	i
Acknowledgements	iii
Contents	iv
List of Tables	vi
List of Figures	vii
Ethics and Confidentiality	viii
List of Abbreviations	viii
<b>1 INTRODUCTION.....</b>	<b>9</b>
<b>1.1 Nutrition and diet.....</b>	<b>10</b>
1.1.1 Typical fruit and vegetable intakes of New Zealand adults .....	10
1.1.2 Snacking.....	11
1.1.3 Work-place snacking.....	11
1.1.4 Diet and chronic disease.....	11
<b>1.2 Physical activity.....</b>	<b>13</b>
1.2.1 Activity levels of New Zealand adults .....	13
1.2.2 Sedentary activity levels of office workers .....	13
1.2.3 Physical activity and chronic disease .....	14
<b>1.3 Smoking .....</b>	<b>15</b>
1.3.1 Smoking in New Zealand.....	15
1.3.2 Work stress and barriers to stopping smoking .....	15
1.3.3 Smoking and physical activity .....	16
1.3.4 Smoking and nutrition.....	16
1.3.5 Smoking and chronic disease .....	16
<b>1.4 Behavioural change the Transtheoretical Model .....</b>	<b>17</b>
1.4.1 Constructs of the Transtheoretical Model .....	17
1.4.1.1 Stages of change .....	18
1.4.1.2 Processes of change.....	18
1.4.1.3 Decisional balance.....	20
1.4.1.4 Self-efficacy .....	20
1.4.2 Applying the Transtheoretical Model to: .....	20
1.4.2.1 Physical activity.....	20
1.4.2.2 Nutrition .....	21
1.4.2.3 Smoking.....	21
<b>1.5 The impact of health promotion programmes.....</b>	<b>22</b>
1.5.1 Physical activity as a gateway to changing behaviours.....	23
<b>2 AIMS AND OBJECTIVES.....</b>	<b>25</b>
<b>3 METHODOLOGY.....</b>	<b>26</b>
<b>3.1 Description of the health promotion programme.....</b>	<b>26</b>
<b>3.2 Selection of participants .....</b>	<b>27</b>

<b>4</b>	<b>DATA COLLECTION .....</b>	<b>28</b>
4.1	Administration of questionnaires .....	28
4.2	Questionnaire development.....	28
<b>5</b>	<b>DATA ANALYSIS .....</b>	<b>31</b>
5.1	Data handling .....	31
5.2	Statistical analysis .....	34
<b>6</b>	<b>RESULTS .....</b>	<b>35</b>
6.1	Characteristics of the participants .....	35
6.2	Perceived fitness .....	36
6.3	Activity levels.....	36
6.4	Perceived health .....	37
6.5	Physical activity.....	38
6.5.1	Stages of change and the participants movements through the stages for physical activity..	38
6.6	Fruit intakes .....	39
6.6.1	Stages of change and the groups movements through the stages for fruit intakes (2 servings per day) .....	40
6.6.2	The decisional balance for eating fruit .....	41
6.6.2.1	The relationship between the decisional balance for eating 2 servings of fruit per day and fruit intake.....	44
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.....	45
6.6.3	Efficacy for eating fruit.....	45
6.6.3.1	The relationship between the efficacy of eating 2 servings of fruit per day and servings of fruit per day .....	47
6.6.3.2	The relationship between efficacy for eating fruit and the stages of change for eating 2 servings of fruit per day .....	47
6.7	Vegetable intakes .....	48
6.7.1	Stages of change and the groups' movements through the stages for vegetable intakes (3 servings per day) .....	49
6.7.2	The decisional balance for eating vegetables .....	49
6.7.2.1	The relationship between the decisional balance for eating 3 servings of vegetables per day and vegetable intake .....	52
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 .....	52
6.7.3	Self-efficacy for eating vegetables.....	53
6.7.3.1	The relationship between the self-efficacy of eating 3 servings of vegetables per day and servings of vegetables per day.....	55
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 .....	55
6.8	Healthy Snacking .....	56
6.8.1	High fat/high sugar snacks .....	56
6.8.2	High fat/high sugar and low fat/low sugar drinks .....	57
6.8.3	Stages of change and the groups' movements through the stages for healthy snacking ...	58

## Contents

6.7.1	Decisional balance for eating healthy snacks.....	60
6.7.1.1	The relationship between the decisional balance of eating healthy snacks and healthy snacking intakes.....	62
6.7.1.2	The relationship between the decisional balance of eating healthy snacks and the stages of change for healthy snacking.....	62
6.7.2	Self-efficacy for eating healthy snacks.....	63
6.7.2.1	The relationship between the self-efficacy of healthy snacking and healthy snacking intake.....	64
	No relationship was demonstrated between self-efficacy for eating healthy snacks and actual healthy snack consumption.....	64
6.7.2.2	The relationship between self-efficacy of healthy snacking and the stages of change for healthy snacking.....	65
<b>6.8</b>	<b>Smoking.....</b>	<b>65</b>
6.8.1	Stages of change and the groups' movements through the stages for smoking.....	65
<b>7. DISCUSSION.....</b>	<b>.....</b>	<b>67</b>
7.5	Stages of change.....	70
7.6	Decisional balance.....	73
7.7	Self-efficacy.....	74
7.8	Tailored interventions vs untailored interventions.....	75
7.9	Weaknesses.....	75
<b>8. CONCLUSION.....</b>	<b>.....</b>	<b>76</b>
8.1	Practical applications for the future.....	78
<b>REFERENCES.....</b>	<b>.....</b>	<b>80</b>
<b>APPENDICES.....</b>	<b>.....</b>	<b>89</b>

### **LIST OF TABLES**

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)).....	16
Table 2: The processes of change (Horwath, 1999).....	19
Table 3: Data Analysis and Management.....	31
Table 4: Participant demographics.....	35
Table 5: Perceived fitness at T1 and T2.....	36
Table 6: Number of days per week each participant is exercising at T1 and T2.....	37
Table 7: Perceived health at T1 and T2.....	37
Table 8: Fruit intake at T1 and T2.....	39
Table 9: Agreement or disagreement with the pros of eating fruit (2 servings per day), comparison between the groups.....	42
Table 10: Agreement or disagreement with the cons of eating fruit (2 servings per day), comparison between the groups.....	43
Table 11: Relationship between pros of fruit intake and intervention groups.....	44
Table 12: Relationship between fruit intake and decisional balance (sum of pros and cons).....	44
Table 13: Self-efficacy for eating fruit (2 servings per day), comparison between the groups.....	46
Table 14: Vegetable intake at T1 and T2.....	48

## Contents

Table 15: Agreement or disagreement with the pros of eating vegetables (3 servings per day), comparison between the groups .....	50
Table 16: Agreement or disagreement with the cons of eating vegetables (3 servings per day), comparison between the groups .....	51
Table 17: Relationship between decisional balance and intervention groups .....	52
Table 18: Self-efficacy for eating vegetables (3 servings per day), comparison between the groups ..	53
Table 19: Relationship between self-efficacy and intervention groups.....	54
Table 20: Relationship between vegetable intake and self-efficacy.....	55
Table 21: Relationship between vegetable intake and self-efficacy for the HPG .....	55
Table 22: Change after comparing the difference in high fat/high sugar and low fat/low sugar foods between T1 and T2 .....	57
Table 23: Change for fruit as snack between T1 and T2.....	57
Table 24: Agreement or disagreement with the pros of healthy snacking, comparison between the groups .....	60
Table 25: Agreement or disagreement with the cons of healthy snacking, comparison between the groups .....	61
Table 26: Relationship between decisional balance and intervention groups .....	62
Table 27: Self-efficacy for healthy snacking, comparison between the groups .....	63
Table 28: Relationship between self-efficacy and intervention groups.....	64

## **LIST OF FIGURES**

Figure 1: Stages of change percentages on becoming more physically active for all groups in T1 and T2 .....	38
Figure 2: HPG percentage movement through the stages for becoming more physically active from T1 to T2 .....	39
Figure 3: Stages of change percentages on fruit intake (2 servings per day) for all groups in T1 and T2 .....	40
Figure 4: HPG percentage movement through the stages for eating 2 servings of fruit from T1 to T2 ... ..	41
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) .....	45
Figure 6: Self-efficacy for fruit consumption compared to stages of change for eating 2 servings of fruit per day (all participants) .....	48
Figure 7: Stages of change percentages for vegetable intake (3 servings per day) for all groups in T1 and T2 .....	49
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) .....	53
Figure 9: Self-efficacy for vegetable consumption compared to stages of change for eating 3 servings of vegetables per day (all participants) .....	56
Figure 10: Stages of change percentages on healthy snacking for all groups in T1 and T2.....	58
Figure 11: HPG percentage movement through the stages for healthy snacking .....	59
Figure 12: NG percentage movement through the stages for healthy snacking .....	59
Figure 13: CG percentage movement through the stages for healthy snacking .....	60
Figure 14: Decisional balance for healthy snacking compared to stages of change for healthy snacking (all participants) .....	63
Figure 15: Stages of change percentages for cutting down smoking for all groups in T1 and T2 .....	65
Figure 16: HPG percentage movement through the stages for cutting down on smoking .....	66
Figure 17: NG percentage movement through the stages for cutting down on smoking.....	66

**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