

GETTING PEOPLE HEALTHIER: INFLUENCING GYM BEHAVIOUR THROUGH COMMUNICATION FRAMING

By

CHRISTINA RAUBENHEIMER

Submitted in fulfilment of the requirements for the degree

MPHIL IN COMMUNICATION MANAGEMENT

In the

FACULTY OF ECONOMIC AND MANAGEMENT SCIENCES

at the

UNIVERSITY OF PRETORIA

Supervisor:

Prof. R. Rensburg

ABSTRACT

The majority of the South African gym population don't visit the gym enough to reap the health rewards. This is not only detrimental for the individual, but also the country as a whole as it impacts the economy. Numerous information driven interventions have been deployed in the hope of motivating people to stay active, but with limited success. Dynamic Inconsistency could explain this type of behaviour, as it suggests that choosing every day to do what you decided to do at a point in time (like visiting the gym everyday) is the biggest stumbling block in following through on a decision. Why? Because making a rational decision in the face of temptation such as sleeping in instead of going to gym, is difficult. An approach subsequently had to be implemented that looked beyond the familiar cognitive approach and searched for new ways to influence healthy choices. A Behavioural Economics theory called Communication Framing was therefore deployed as a potential behaviour modifier.

The purpose of this study was subsequently twofold. Firstly, it was to understand whether infrequent gym visitors (those who visited the gym less than 11 times a month) did so because of Dynamic Inconsistent decisions. Secondly, it was to see if positive or negative goal-framed messages would influence those that did fall into the Dynamic Inconsistency trap to exercise less than 12 times a month.

A multi-method quantitative research approach was used due to the nature of the study. Before Communication Framing could be tested as a method to influence members to visit the gym more often, those who were influenced by Dynamic Inconsistency had to be identified. Thus the research had to be divided into two phases.

Phase One made use of the newly developed Exercise Consistency Questionnaire, which aimed to discover those who made gym, related Dynamic Inconsistent decisions. A total of 623 respondents answered the questionnaire in some shape or form; however, some had to be excluded as they did not comply with the sample criteria. A workable sample of 446 individuals, those who exercised less than 11 times a month, was therefore identified.

Most respondents across the two groups had some degree of Dynamic Inconsistency, thus succumbed to the temptation. With the help of statistical analysis, a slight negative

correlation was found across both groups, suggesting a slight tendency towards an “*exercise-increase/ impulsivity-decrease*” relationship. The difference between the two, however, was in the degree of this relationship. Those who exercised less than 11 times a month had a much higher Dynamic Inconsistency score than those who exercised more than 12 times a month. The conclusion that people who exercised less were slightly more likely to fall into the temptation-trap than those who exercised more frequently was therefore made and proved why this group were in need of an intervention.

Those identified became the population for Phase Two and were randomly divided into three groups. One group receive a negative goal-framed message, the second group a positive goal-framed-message and the third none as it became the control.

The 446 respondents subsequently became the sample for Phase Two. Descriptive and inferential statistics were used to determine if any of the interventions succeeded in getting people to exercise more than 11 times a month. An ANOVA test was performed and indicated that the changes within the groups were more likely due to chance as appose to the message interventions. Further analyses in the form of scatterplots and frequency distribution suggested that the messages did have an effect, but that it performed different functions.

The positive goal-framed messages had an effect on those who did not exercise at all. It moved them into becoming active. The negative goal-framed message on the other hand affected those who already exercised and got them to exercise slightly more often. Neither message however delivered on the goal of getting people to exercise more than 12 times a month.

The effects however were minimal and only came to the fore once an in-depth analysis was done. Results should therefore be seen more as an indication rather than fact. Additional research that considers the numerous weaknesses identified in this study, should be done in order to prove the results accurate.

Keywords Behavioural Economics, exercise, Delayed Discounting, Dynamic Inconsistency, Communication Framing

TABLE OF CONTENTS

DEFINITIONS OF KEY TERMS	xiii
CHAPTER 1: AN OVERVIEW AND BACKGROUND OF THE STUDY	1
1.1 INTRODUCTION.....	1
1.2 THE IMPORTANCE OF A MORE ACTIVE SOUTH AFRICA	2
1.2.1 Why individuals need to exercise more often.....	3
1.2.2 The South African gym visitor	4
1.2.3 The changing role of communication	5
1.3 PREVIOUS STUDIES	7
1.3.1 Behavioural Economics, physical activity and exercise	7
1.3.2 Delayed Discounting	7
1.3.3 Dynamic Inconsistency	8
1.3.4 Communication Framing	8
1.3.5 The gaps	9
1.3.6 Behavioural Economics: providing insight into the infrequent gym visitor.....	10
1.4 RESEARCH STATEMENT.....	11
1.5 RESEARCH OBJECTIVES	12
1.6 ACADEMIC VALUE AND CONTRIBUTION OF THE STUDY	12
1.7 DELIMITATIONS OF THE STUDY	13
1.7.1 The difference between physical activity and exercise	13
1.7.2 Who could qualify for the study	14
1.7.3 Nature of the research	14
1.8 RESEARCH DESIGN AND METHODOLOGY.....	15
1.9 DISSERTATION CHAPTER BREAKDOWN	16
CHAPTER 2: BEHAVIOURAL ECONOMICS' VIEW OF DECISION MAKING	18
2.1 INTRODUCTION.....	18
2.2 THE ESSENCE OF BEHAVIOURAL ECONOMICS	18
2.3 THE INNER-WORKINGS OF DECISION MAKING	19
2.3.1 Dual system approach in a nutshell	20
2.3.2 Impulsive or rational: hot-cold dual system theory	21
2.3.3 Marrying the dual system approach with exercise	22

2.4	WHY TEMPTATION LEADS PEOPLE ASTRAY	23
2.5	IMPULSIVITY: SAYING YES WHEN YOU SHOULD SAY NO.....	23
2.6	SELFCONTROL: ATTEMPT TO RESIST THE IRRESISTABLE	24
2.7	CONCLUSION	25
CHAPTER 3: UNDERSTANDING SELF-CONTROL AND TEMPTATION WITH THE HELP OF BEHAVIOURAL ECONOMIC THEORIES		27
3.1	INTRODUCTION.....	27
3.2	DELAYED DISCOUNTING: THE INSTANT OR THE FUTURE?.....	27
3.3	DYNAMIC CONSISTENCY: STICKING TO THE PLAN	29
3.4	DYNAMIC INCONSISTENCY: STRAYING FROM TO THE PLAN.....	33
3.4.1	Battle of the selves	34
3.5	DELAYED DISCOUNTING AND DYNAMIC INCONSISTENCY IN ACTION: HEALTH RELATED BEHAVIOUR.....	35
3.6	CONCLUSION	36
CHAPTER 4: USING COMMUNICATION FRAMING TO INFLUENCE DYNAMIC INCONSISTENT DECISIONS		38
4.1	INTRODUCTION	38
4.2	COMMUNICATION FRAMING: FITTING INTO COMMUNICATION THEORY	39
4.3	COMMUNICATION FRAMING: THE WAY SOMETHING IS SAID MATTERS	40
4.4	COMMUNICATION FRAMING TYPES: THE WAYS OF SAYING THINGS	41
4.4.1	Attribute framing: highlighting a characteristic	42
4.4.2	Goal frame: highlighting a consequence	43
4.4.3	Which option is best?	44
4.5	GOAL FRAMING OPTIONS: POSITIVE OR NEGATIVE	44
4.6	WHAT TO SAY: CONSIDERING MESSAGE TOPICS.....	45
4.7	CONCLUSION	46
CHAPTER 5: RESEARCH METHODOLOGY AND DESIGN		47
5.1	INTRODUCTION	47
5.2	RESEARCH PARADIGM: THE OVERARCHING APPROACH.....	47

5.2.1	Pragmatism's view of reality: ontology	48
5.2.2	Pragmatism's view of knowledge: epistemology	48
5.2.3	Pragmatism's view of values: axiology.....	49
5.2.4	Pragmatism's data collection approach: methodology	50
5.2.5	Pragmatism in summary	50
5.3	GENERAL DESCRIPTORS OF THE RESEARCH.....	51
5.4	RESEARCH DESIGN: THE BROAD RESEARCH APPROACH	52
5.4.1	The reason for a multi-method quantitative research approach.....	54
5.5	PHASE ONE RESEARCH METHOD	56
5.5.1	Research type: Descriptive	56
5.5.2	Research method: Survey.....	56
5.5.3	Research technique: Internet survey	57
5.6	PHASE TWO RESEARCH METHOD.....	58
5.6.1	Research type: Observational.....	58
5.6.2	Research method: Experimental.....	59
5.6.3	Research technique: Text messages (sms).....	60
5.7	TARGET POPULATION: WHO ARE WE LOOKING AT?	61
5.8	SAMPLING: IDENTIFYING THE LUCKY FEW	63
5.8.1	Sampling categories: the broader selection approach	63
5.8.2	Sample size: the amount count.....	64
5.8.3	Sampling technique: the specific method.....	66
5.9	PHASE ONE MEASUREMENT INSTRUMENT: MEASURING THE SELECTED FEW.....	66
5.9.1	Phase One: Measuring Dynamic Inconsistency.....	67
5.9.2	Measuring tool: the Exercise Consistency Questionnaire.....	68
5.10	PHASE TWO MEASUREMENT INSTRUMENT: OBSERVING THE SELECTED FEW.....	70
5.11	PHASE 1: DATA ANALYSES - IDENTIFYING THE IRINFREQUENT GYM VISITOR	70
5.11.1	Identifying the workable respondent group	70

5.12 PHASE 2: DATA ANALYSES – CHANGING THE BEHAVIOUR OF THE IRINFREQUENT GYM VISITOR	71
5.12.1 Classifying the data obtained	71
5.12.2 Types of statistics: descriptive and inferential	72
5.13 CONCLUSION	73
CHAPTER 6: DATA ANALYSIS AND FINDINGS	75
6.1 INTRODUCTION	75
6.2 PHASE ONE: WAS GYM RELATED DYNAMIC INCONSITENT DECISIONS MADE?	76
6.2.1 Coding raw data	76
6.2.2 Inferences arising from the data	80
6.2.3 Answering the first objectives	80
6.3 PHASE TWO: DID ANY OF THE COMMUNICATION INTERVENTIONS CHANGE BEHAVIOUR?	81
6.3.1 The detail of the data	81
6.3.2 Visualising the data (descriptive)	82
6.3.3 Comparing the 2013 Control and communication intervention groups (descriptive)	84
6.3.4 Comparing the 2014 intervention groups to their respective 2013 base lines groups (descriptive)	85
6.3.5 Comparing the 2014 Control Group with the 2014 communication intervention groups (descriptive)	87
6.3.6 In summary	88
6.3.7 Testing for change: ANOVA (inferential)	88
6.3.8 Analysing each group’s individual data (descriptive)	90
6.3.8.1 <i>May’s scatter graphs</i>	91
6.3.8.2 <i>June’s scatter graphs</i>	95
6.3.8.3 <i>July scatter plots</i>	99

6.3.9	Scatter plot findings in summary.....	102
6.3.10	Frequency distribution: clustering the data (descriptive).....	103
6.3.11	Growth or decline shifts within gym attendance classes (descriptive).....	105
6.3.12	Control Group's growth and decline.....	106
6.3.13	Positive Group's growth or decline	108
6.3.14	Negative Group's growth and decline	111
6.3.15	Positive Group's trends.....	114
6.3.16	Negative Group's trends.....	116
6.4	OVERALL FINDINGS	118
6.5	CONCLUSION.....	120
CHAPTER 7: QUALITY AND RIGOUR OF RESEARCH DESIGN.....		122
7.1	INTRODUCTION	122
7.2	UNDERSTANDING VALIDITY.....	123
7.3	EXTERNAL VALIDITY	124
7.4	INTERNAL VALIDITY	125
7.5	MEASUREMENT VALIDITY	127
7.5.1	Phase One's measurement validity: Exercise Consistency Questionnaire... 127	
7.5.1.1	<i>Face validity</i>	128
7.5.1.2	<i>Content validity</i>	128
7.5.1.3	<i>Predictive criterion validity</i>	129
7.5.1.4	<i>Construct validity</i>	130
7.5.2	Phase Two's measurement validity: structured observations	132
7.6	ECOLOGICAL VALIDITY.....	133
7.7	UNDERSTANDING RELIABILITY	133
7.8	ENSURING THE EXERCISE CONSISTENCY QUESTIONNAIRE WAS RELIABLE.....	134
7.8.1	Test re-test.....	135
7.8.2	Alternative form	135

7.8.3	Internal consistency	135
7.9	ENSURING THE STRUCTURED OBSERVATION DESIGN WAS RELIABLE...	136
7.10	RESEARCH ETHICS.....	138
7.10.1	Protect from harm	138
7.10.2	Voluntary, informed participation.....	138
7.10.3	Right to privacy	139
7.10.4	Honesty of findings.....	139
7.11	CONCLUSION.....	140
CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS.....		142
8.1	INTRODUCTION	142
8.2	IN SUMMARY: SEEING THE BIGGER PICTURE	142
8.2.1	Study's primary and secondary objectives.....	146
8.3	ANSWERING THE RESEARCH OBJECTIVES	147
8.3.1	Primary objective #1:.....	147
	8.3.1.1 Secondary objective #1a:	148
	8.3.1.2 Secondary objective #1b:	148
8.3.2	Primary objective #2:.....	148
	8.3.2.1 Secondary objective #2a:	149
	8.3.2.2 Secondary objective #2b:	149
8.3.3	Primary objective #3:.....	149
	8.3.3.1 Secondary objective #3.a:	150
	8.3.3.2 Secondary objective #3.b:	150
8.4	IMPLICATIONS OF THE FINDINGS	150
8.5	LIMITATIONS OF THE STUDY	151
8.6	RECOMMENDATIONS FOR FUTURE STUDIES.....	152
8.7	IN CONCLUSION.....	154
9. LIST OF REFERENCES.....		155
APPENDICES.....		193
APPENDIX A.....		193

APPENDIX B.....	198
APPENDIX C.....	200
APPENDIX D.....	206

LIST OF TABLES

Table 1: Abbreviations used in this document.....	xiv
Table 2: Attributes of Internet questionnaires and their counter strategies applicable to this study.....	57
Table 3: Comparing the three 2013 groups in order to identify a trend over the months of May, June and July	84
Table 4: Comparing the 2014 intervention groups to their respective 2013 base line periods in order to identify effectiveness over the months of May, June and July.	85
Table 5: Comparing the 2014 communication intervention groups to the 2014 Control Group in order to identify any kind of effectiveness over the months of May, June and July.....	87
Table 6: Analysing the change variance within and between May's Positive, Negative and Control Groups.....	89
Table 7: Analysing the change variance within and between June's Positive, Negative and Control Groups.....	89
Table 8: Analysing the change variance within and between July's Positive, Negative and Control Groups.....	89
Table 9: Example of a frequency table for the Positive Group for the month of May 2013, which became one of the data sets reflected in figure 22.....	105
Table 10: Indicating the growth, decline and shifts of the Control Group over May, June and July from 2013 to 2014.	106
Table 11: Indicating the growth, decline and shifts of the Positive Group over May 2013 and 2014 while comparing the results to the Control Group.....	108
Table 12: Indicating the growth, decline and total positive or negative shifts of the Positive Group over June 2013 and June 2014, whilst comparing the results to the Control Group.	109
Table 13: Indicating the growth, decline and the total positive or negative shifts of the Positive Group over July 2013 and July 2014, when comparing the results to the Control Group.	110

Table 14: Indicating the growth, decline and total positive or negative shifts of the Negative Group over May 2013 and May 2014, when comparing the results to the Control Group. 111

Table 15: Indicating the growth, decline and total positive or negative shifts of the Negative Group over June 2013 and June 2014, when comparing the results to the Control Group. 112

Table 16: Indicating the growth, decline and total positive or negative shifts of the Negative Group over July 2013 and July 2014, when comparing the results to the Control Group. 113

Table 17: Indicating the growth and decline of the Positive Group over May, June and July of 2013 and 2014. Three trends lines were identified in the zero, 1 to 3 and 7 to 9 classes 114

Table 18: Indicating the growth and decline of the Negative Group over May, June and July of 2013 and 2014. The results were then checked for a trend-line against the respective Control Groups. 116

LIST OF FIGURES

Figure 1: Gym attendance frequency of South Africa’s gym members.....	4
Figure 2: A visual representation of the Delayed Discounting theory, indicating how people will choose the sooner, smaller reward the longer they have to wait for the bigger, future reward.....	28
Figure 3: A visual representation of a health related decision tree developed by Goetz (2011:XV).....	31
Figure 4: A visual representation of a gym related decision tree	32
Figure 5: Summary of methodological and effect differences in attribute and goal framing.	42
Figure 6: Providing a visual representation of positive and negative attribute framing where the focus is on a measurable element.	42
Figure 7: Representation of basic goal framing processes where messages highlight the consequences of a specific action.	43
Figure 8: The pragmatists have a variety of options available with regards to their research design, as it follows a multiple method approach.	53
Figure 9: Showcasing the different elements that need to be considered before a sampling strategy can be deployed.	62
Figure 10: Those who exercise more than 12 times a month’s Dynamic Inconsistent scores decrease slowly as the monthly average visits increase.	78
Figure 11: Those who exercise less than 11 times a month’s Dynamic Inconsistent scores decrease significantly as the monthly average visits increase.....	79
Figure 12: Visual representation of the average monthly exercise rates across the 2013 base and 2014 intervention periods.....	83
Figure 13: Comparing the Control Group’s May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014.....	92
Figure 14: Comparing the Positive Group’s May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014.....	93

Figure 15: Comparing the Negative Group's May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014.....	94
Figure 16: Comparing the Control Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	95
Figure 17: Comparing the Positive Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	96
Figure 18: Comparing the Negative Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	97
Figure 19: Comparing the Control Group's July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	99
Figure 20: Comparing the Positive Group's July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	100
Figure 21: Comparing the Negative Group's July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014.....	101
Figure 22: Comparing the frequency distribution of the May 2013 Positive Group to the frequency distribution of the May 2013 Control Group.....	104
Figure 23: Comparing the distribution frequencies of the May 2013 Positive Group to the distribution frequencies of May 2013 Control Group.....	207
Figure 24: Comparing the distribution frequencies of the May 2014 Positive Group to the distribution frequencies of May 2014 Control Group.....	208
Figure 25: Comparing the distribution frequencies of the June 2013 Positive Group to the distribution frequencies of June 2013 Control Group.....	209
Figure 26: Comparing the distribution frequencies of the June 2014 Positive Group to the distribution frequencies of June 2014 Control Group.....	209
Figure 27: Comparing the distribution frequencies of the July 2013 Positive Group to the distribution frequencies of July 2013 Control Group.....	210
Figure 28: Comparing the distribution frequencies of the July 2014 Positive Group to the distribution frequencies of July 2014 Control Group.....	210
Figure 29: Comparing the distribution frequencies of the May 2013 Negative Group to the distribution frequencies of May 2013 Control Group.....	211

Figure 30: Comparing the distribution frequencies of the May 2014 Negative Group to the distribution frequencies of May 2014 Control Group..... 212

Figure 31: Comparing the distribution frequencies of the June 2013 Negative Group to the distribution frequencies of June 2013 Control Group..... 213

Figure 32: Comparing the distribution frequencies of the June 2014 Negative Group to the distribution frequencies of June 2014 Control Group..... 214

Figure 33: Comparing the distribution frequencies of the July 2013 Negative Group to the distribution frequencies of July 2013 Control Group 215

Figure 34: Comparing the distribution frequencies of the July 2014 Negative Group to the distribution frequencies of July 2014 Control Group 215

DEFINITIONS OF KEY TERMS

The key terms used throughout this study were Behavioural Economics, decision-making, temptation, impulsivity, self-control, Delayed Discounting, Dynamic Inconsistency, and Communication Framing. The definitions for these terms are as follows:

Behavioural Economics: Economic theories that incorporate the psychological limitations of being human into decision-making (see chapter 2).

Temptation: An appealing, sudden and often powerful persistent urge or impulse that results in conflicting ‘should-I-or-shouldn’t-I’ emotions. It is characterised by little deliberation (Dholakia, 2000:957) and focuses an individual’s thoughts toward impulsive action (Nordgren & Chou, 2011:1387) that, more often than not, leads to feelings of regret (see section 2.4 for a detailed discussion).

Impulsivity: Instantly gratifying decisions that affect a person’s ability to plan ahead due to their heightened levels of impatience. These decisions often result in behaviour that is not in line with ideals, values, morals, social expectations and consequently a person’s best interest (section 2.5 provides comprehensive information about the topic).

Self-control: The ability to resist desires created by impulses or temptations which would otherwise lead to the failure of implementing a future-orientated decision (more information is provided in section 2.6).

Delayed Discounting: It is a form of impulsivity that decreases the perceived value of a future reward. The longer one has to wait, the more one starts to prefer the smaller instant pleasure, as opposed to a more valuable or beneficial future benefit (see section 3.2).

Dynamic inconsistency: Another measure of impulsivity which occurs when people have good intentions. A decision is made about a far-sighted course of action, but is not followed through on because the individual succumbed to the temptation in the moment of having to take action (see section 3.4).

Communication Framing: When identical objects or events are presented in two opposing manners, which result in different behaviours. Positive and negative framing was investigated in this study (see chapter 4).

The following abbreviations summarised in Table 1 have been used in the rest of the dissertation.

Table 1: Abbreviations used in this document

Abbreviation	Meaning
WHO	World Health Organisation
OECD	Organisation for Economic Cooperation and Development
SABINET	South African Bibliography Network
LSM	Living Standard Measures
AMPS	All Media and Products Survey

CHAPTER 1: AN OVERVIEW AND BACKGROUND OF THE STUDY

Chapter outline:

The purpose of this chapter is to:

- Provide an overview of why it is important to keep South Africans active
- Consider the changing roll of communication and how Behavioural Economics can assist
- Discuss similar previous studies
- Present the study's research statement and subsequent primary and secondary objectives
- Identify the contribution this study is making
- Define the parameters of the study
- Provide a brief summary of the research methodology and design used in the study
- Give an overview of the dissertation's chapter breakdown

1.1 INTRODUCTION

The importance of being active on a regular basis has never been brought into question. With living healthier, being fitter and losing weight being three of the most common New Year's resolutions globally, it becomes clear that people are realising the significance of living an active lifestyle. South Africa is no different. One of the leading health clubs in South Africa stated that January is one of their busiest months due to the influx of new members. These good intentions are unfortunately short lived as attendance drops off significantly by mid-February (The New Age, 2013).

Following through on a long-term beneficial decision such as visiting the gym more often is clearly a problem for numerous South Africans. The most obvious question: why? The premise of this research is that people do not stick to their original decision of visiting the gym when the future becomes the present. They succumb to instant temptations; those innocent excuses which everyone uses from time to time. The "*I'm so busy at work. I'm having a bad day. Looks like bad weather. I'll be stuck in traffic*" leads to preference reversal, where the initial decision of visiting the gym does not take place. This then

culminates in future repercussions that are widespread. Not only does the individual end up feeling the effects physically, emotionally and in their own pocket due to medical bills, but they also impact the economy negatively.

This study, therefore, had ambitious ideals: test whether the premise of the study is true and if so, develop a communication intervention that will assist infrequent gym members, who yield to the irresistible instant reward of not going, to visit the gym more often. The focus was thus on behaviour change, instead of attitudinal or perception influence.

A two-phased multi-method quantitative study was implemented in order to test these assumptions. The first phase identified those who struggled to follow through on their initial decision, while the second tested whether one of two interventions got the identified individuals to visit the gym more often.

The point of this chapter is subsequently to paint the bigger picture. It will highlight the necessity of the study, lay the theoretical foundation, and define the objectives and methodology of the study.

1.2 THE IMPORTANCE OF A MORE ACTIVE SOUTH AFRICA

The health conversation has become more prevalent in recent years. The topic has moved from a casual conversation between friends, to a key focal point in the public domain. With chronic diseases such as stroke, cancer, chronic respiratory diseases, diabetes and cardiovascular illnesses rapidly increasing, a heightened concern about-health is definitely warranted. To put it in perspective, 63% of all deaths are due to chronic diseases, making this cluster of illnesses one of the leading causes of mortality in the world (World Health Organisation, 2013a).

Apart from these diseases having a detrimental effect on individuals, it also affects an economy's income negatively. Brazil, Russia, India and China (BRIC countries), for instance, lose between 3 and 18 billion US dollars in national income every year due to chronic diseases (World Health Organisation, 2005). This then have a negative impact on a country's GDP. Predictions were that countries who belong to the Organisation for

Economic Cooperation and Development (OECD), which included South Africa, would spend up to 20% of their GDP on healthcare by 2015 (Drouin, Hediger, Henke, Kanzler, Leydon & De Sant, 2008:7). This is in stark contrast to the World Health Organisation's (WHO) recommendation of a 5% GDP contribution (Andrew, 2012). It is therefore a big concern that South Africa's healthcare contribution has already hit close to the 9% mark in 2010 (World Health Organisation, 2103b).

For that reason, something needs to be done to get people to make healthier choices, as it can prevent and control numerous chronic illnesses resulting in lower expenditure on health related treatment (Dixon-Fyle & Kowallik, 2010; Anon, 2011). The key risk factors that result in unhealthy living, such as an unhealthy diet, over-eating, physical inactivity and smoking, should therefore become the key focus for any kind of behaviour modification intervention (Abegunde, Beaglehole, Durivage, Epping-Jordan, Mathers, Shengelia, Strong, Tukuitonga & Unwin, 2005). Physical inactivity became the risk factor of choice. The following section will unpack the reasons why.

1.2.1 Why individuals need to exercise more often

Even though physical inactivity is only the fourth leading contributor to global mortality, it ranked higher than obesity (World Health Organisation, 2010:7,10). The impact of not being active is astounding. According to Gaudin (2013), a lack of physical activity leads to 3.2 million deaths a year. Of this total, 2.6 million are within the low and middle-income countries. Moreover, 670 000 are premature as they are below the age of 60. Why does physical inactivity have such dire effects? Because it is a major contributing factor, and in some instances the main contributor to various chronic diseases. An approximate 21% to 25% of breast and colon cancer cases, 27% of diabetes and 30% of ischaemic heart disease cases are caused by physical inactivity (World Health Organisation, 2010:7,10).

These morbid effects can however be countered. Participating in moderate intensity aerobics for two and a half hours a week contribute to weight loss and healthy weight maintenance. This in turn lowers the risks of heart disease, diabetes, strokes, high blood pressure, osteoporosis and certain cancers. It also helps to reduce stress and lift one's mood. Yet despite all of these health benefits, an inactive lifestyle is still at the order of the

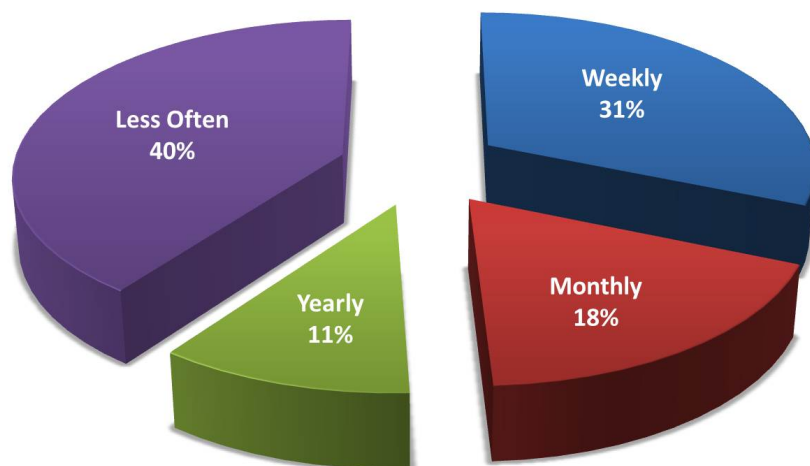
day due to TV, video games and computers becoming the pastimes of choice. More “energy” is therefore consumed than used. The rise of global weight gain and chronic diseases are thus no surprise (Harvard School of Public Health Obesity Prevention, 2012; World Health Organisation, 2010:7,10). Getting people to make the better choice of being more active is subsequently of the utmost importance.

For this reason the main goal of the study was to increase individuals’ activity levels to at least two and a half hours a week. This was always going to be a tall order when considering the behaviour of South African gym members.

1.2.2 The South African gym visitor

According to AMPS (2012a), the South African gym population comprises of just over 8 million individuals and can be divided into weekly, monthly, yearly or less often attendance sub-groups (see Figure 1).

Figure 1: Gym attendance frequency of South Africa’s gym members.



The assumption is that exercising two and a half hours a week would be relatively easy for the weekly visitor, as it equates to 30 minutes a day for five days or 50 minutes a day for three days. A weekly visitor could therefore theoretically visit the gym 12 times a month (three x 50 minute visits a week), which would be enough to experience the accompanying health benefits.

Any of the other sub-groups (monthly, yearly, less often), however, would not. A person who visits the gym monthly, for instance, would need to exercise more than three hours per gym visit (if the individual goes three times in a month), a highly unlikely occurrence. The yearly and less often groups are even more improbable, as both groups would need to have close to a full day's session in order to achieve the required accumulative weekly exercise quota. Visiting the gym 12 times a month is therefore the only viable option, in order to meet the two and a half hours a week criteria.

The problem however is that only 31% of the South African gym population exercise weekly (AMPS, 2012a), making them the only group who would be able to experience the health benefits of being physically active. The remainder of the gym population (more than two thirds) would not, and would thus be susceptible to chronic diseases. This would not only put financial strain on themselves, but also the South African economy.

1.2.3 The changing role of communication

Most South African gym members clearly do not visit the gym enough to reap the health benefits. One would assume that paying for a gym membership at a sizeable monthly premium would be adequate motivation for gym members to exercise the required number of times per month. This is not the case. Communication interventions are thus deployed; focused on the importance of living a healthy lifestyle, yet people still engage in risky behaviour such as not exercising (Dixon-Fyle *et al.*, 2010:63). Why the lack of results when campaigns are geared at getting people healthier? Because the focus of the campaigns were not necessarily to change behaviour.

Traditionally campaign planning and management within the communication discipline, concentrate on building attitudes, beliefs and opinions (Gordon, 2011). Even when looking at commercial communication campaigns the aim is to create a category need, brand awareness, and brand attitude or even purchase intent (Percy & Rosenbaum-Elliott, 2012:7). None of these authors mentioned anything about actual behaviour change, yet health campaigns whose aim is to change behaviour, follow a similar approach.

Numerous interventions aimed at getting people to adopt healthier behaviours make use of persuasive communication with a motivation-through-information goal as the crux of the message (Gallagher & Updegraff, 2012:101). Basically the traditional approach to communication.

Unfortunately this type of approach fails more often than not, as information is not enough of a motivator. Think about the amount of messages out there that highlights the importance of living healthier and yet people still continue to engage in risky behaviour such as smoking, eating unhealthy food and not exercising (Dixon-Fyle *et al.*, 2010:63). A new approach is subsequently warranted.

This shift has started to take place with studies focusing more on how initial exercise motivation can be translated into sustained behavioural change (King & Sallis, 2009:287). One of the key philosophies that are being integrated to this end is Behavioural Economics (Bulik, 2010). This school of thought identifies novel behavioural levers that do not rely on changing awareness or attitudes, but rather actual behaviour (Chance, *et al.*, 2012:2). It aims to understand people's decision-making process in real life by integrating psychology with economic thinking (Boyd, 2010:3; Mullainathan & Thaler, 2000:1; Thorgeirsson & Kawachi, 2013:1). The result: communication campaigns that change behaviour.

A real life example is the 2012 American elections where numerous Behavioural Economics and psychology insights were used in Barack Obama's victorious election campaign (Bulik, 2010; Hollingworth, 2013). Even lifestyle intervention programs such as weight loss and smoking-cessation programs have started to apply Behavioural Economic thinking with great success (Thorgeirsson & Kawachi, 2013:185). Tactics such as incentives (Dixon-Fyle *et al.*, 2010:65), social norm changes, making physical activity more fun through new habits, new cultural frames (Smith & Monge, 2011:33; Zimmerman, 2009:289) or finding ways to deliver information in a more impactful way (Dixon-Fyle *et al.*, 2010:66) have all been applied within the health context.

Getting a better understanding of how people really behave and make decisions have a big impact on the type of communication campaigns that are developed. This study subsequently wanted to make communication more effective with the help of Behavioural

Economics' thinking. The aimed result was that those who do make decisions based on the Behavioural Economics theories would adjust their behaviour accordingly once exposed to a Behavioural Economic tactic communication campaign.

1.3 PREVIOUS STUDIES

An extensive search on Sabinet, EBSCOHost, Emerald, Infotract, JSTOR and Google Scholar was done across the following key elements of this study: Behavioural Economics and physical activity or exercise, Delayed Discounting, Dynamic Inconsistency and Communication Framing.

1.3.1 Behavioural Economics, physical activity and exercise

Behavioural Economics is an alternative to traditional economics. Studies within this field focus less on hypothetical, 'perfect' or 'correct' decisions and more on the real intricacies of actual behaviour.

Two main study areas with regards to Behavioural Economics and individuals getting physically active or exercising came to the fore. The first was studies that looked at a total lack of physical activity (Smith & Monge, 2011:33). The second were those who focused on extreme health problems such as obesity (Goldhaber-Fiebert & Garber, 2011). Most studies however took place in controlled environments as appose to real situations within a general population (Dixon-Fyle & Kowallik, 2010:65; Marteau, Ogilvie, Roland, Suhrcke & Kelly, 2011:263).

1.3.2 Delayed Discounting

Delayed Discounting provides insight into how people prefer the smaller, immediate reward over the bigger, delayed reward (MacKillop, Miranda, Monti, Ray, Murphy, Rohsenow, McGeary, Swift, Tidey & Gwaltney, 2010:20). Numerous studies focused on gaining a better understanding of people's choices when faced with immediate and delayed results (Daugherty & Brase, 2009:202). Some focused on the neurological perspective, aiming to understand the inner workings of the brain when making these

types of decisions (Louie & Glimcher, 2010; Peters & Büche, 2010). Others placed emphasis on discovering whether Delayed Discounting works the same way in both animals and humans (Freeman, Green, Myerson & Woolverton, 2009; Setlow, Mendez, Mitchell & Simon, 2009).

The majority, however, concentrated on understanding disorders or addictive behaviours (Epstein, Salvy, Carr, Dearing & Bickel, 2010; Field, Santarcangelo, Sumnall, Goudie & Cole, 2006; Johnson, Bickel, Baker, Moore, Badger & Budney, 2010; Kaufman - Scarborough & Cohen, 2004; MacKillop *et al.*, 2010).

Only one study was dedicated to exercise and Delayed Discounting, however the angle was on the correlation between optimism, Delayed Discounting and exercise (Smith, 2010).

1.3.3 Dynamic Inconsistency

Dynamic Inconsistency is an extension of Delayed Discounting and describes how people do not necessarily follow through on their initial, more beneficial decision when faced with a more tempting option in the present. Simply stated, it is when preference reversal takes place over time (Chapman & Elstein, 1995:375).

Most Dynamic Inconsistency studies dealt with addictive behaviours (Bickle, Odum & Madden, 1999; Camchong, McDonald, Nelson, Bell, Mueller, Specker & Lim, 2011; Petry, 2001). A few money and reward studies also came to the fore (Johnson & Bickel, 2002; Petry, 2001), but they were in the minority.

1.3.4 Communication Framing

Communication Framing can be described as the presentation of identical objects, scenarios or events in opposing manners, with the aim of achieving different behavioural results. Two global studies, making use of framing to promote participation in physical activity, have been identified (Latimer, Rench, Rivers, Katulak, Materese, Cadmus, Hicks, Hodorowski & Salovey, 2008; van 't Riet, Ruiters, Werrij & de Vries, 2010).

1.3.5 The gaps

No South African study could be found that dealt with Behavioural Economics, Dynamic Inconsistency, Communication Framing or any communication applications of the aforementioned constructs. However additional gaps were found that would justify the need for this study even more.

There is a definite gap in performing a study that is focused on maintaining or increasing exercise. To get people active does not guarantee that they will stay active, as proven by one of the leading health clubs statistics: 60% of memberships tend to go unused (The New Age, 2013). As stated in section 1.2.1, this could lead to chronic illnesses, which can become a financial burden on the individual, as well as the state. Getting people to exercise more is subsequently of utmost importance.

Most studies with regards to Delayed Discounting and Dynamic Inconsistency focused on addictive behaviour and how to get people to stop acting on the temptation of immediate gratifying, hurtful behaviour. The same principle can apply to exercise even though it is not addictive for most. With 61% of South African gym members not exercising enough to reap the health rewards (AMPS, 2012a), a need exists to help those who have gym contracts to resist the temptation of not going to gym.

Lessons were definitely learnt and incorporated from the international Delayed Discounting study that was found. However its focus was on the relation between optimism and Delayed Discounting and its effect on exercise (Smith, 2010). It was not about helping existing gym members to stay the course as they initially intended.

Lastly, most Behavioural Economic research projects were performed in a controlled environment (Marteau *et al.*, 2011:264). A study that focused on these constructs within a real life setting would subsequently strengthen the field as a whole.

The study therefore addressed all the gaps mentioned: it was a local study dedicated to help those who visit the gym infrequently, to maintain or increase their gym attendance within a real gym population.

1.3.6 Behavioural Economics: providing insight into the infrequent gym visitor

Behavioural Economics differs from traditional economics in four key assumptions. Firstly, it assumes that people are emotional beings who regularly make mistakes. These mistakes subsequently result in deviations from standard economic models. Secondly, the theorists recognise that people have limited cognitive abilities, meaning they can only handle a certain amount of information at a time. Bounded self-interest' is the third assumption which relates to people's willingness to sacrifice their own interests for the sake of others. 'Bounded willpower' is the last assumption and relates to how people often make poor decisions that ultimately impact their future negatively (Mullainathan & Thaler, 2000:1).

Most consumers know how to improve their health. They know they need to exercise more often, yet few act accordingly (Dixon-Fyle *et al.*, 2010:63). They would rather choose the temptation of a little more sleep, a movie or a pizza, which is much more appealing than the alternatives of sweating it out in the gym and making healthy dietary choices (Diekhof, Nerenberg, Falkai, Dechent, Baudewig & Gruber, 2012:2769). People know they should choose the latter, but in the presence of an immediate, more appealing temptation, the battle for self-control becomes difficult to near impossible (Berns, Laibson & Loewenstein, 2007:2).

Problems of self-control typically arise in situations that involve a Behavioural Economic theory called Delayed Discounting, also termed Inter Temporal Choice or Advance Discounting (Daugherty & Brase, 2010:202). This construct serves as an index of impulsivity and reflects a person's ability to delay pleasure (MacKillop, Amlung, Wier, David, Ray, Bickel & Sweet, 2012:20). It is also a typical characteristic that comes to the fore with preventative chronic illness behaviours (Thorgeirsson & Kawachi, 2013:187), such as exercise.

Delayed Discounting occurs when costs and benefits are separated due to the amount of time lapsed. In layman's terms: the longer people have to wait for future benefits, the more likely they are to choose the immediate result, because the future gets devalued (Kim, Sung & McClure, 2012:650; Samson & Voyer, 2012:57; Thorgeirsson & Kawachi,

2013:187). Eating a piece of cake now because of the instant gratification, rather than going to the gym in order to achieve an attractive physique in the future, is a great example of this theory in action. The 'now' overrides the 'later'.

An extension of Delayed Discounting called Dynamic Inconsistency provides more insight into why people discount the future. Goldhaber-Fiebert and Garber (2011:4) describes this theory with the help of a practical example: *“While the prospect of exercising for three months and improving one’s health seems attractive now, the daily decision to exercise is a much more difficult one.”* Choosing to do what one decided to do at a point in time, on a daily basis, is therefore the biggest stumbling block. Why? Because making a rational decision in the face of temptation is difficult. *“How can agents [people] command their temptations and cooperate voluntarily when, in light of instantaneous reward, it is so enticing to cheat and indulge?”* (Khalil, 2008:178).

This concept of ‘making a decision but then changing one’s mind in the face of a temptation’ is then the essence of Dynamic Inconsistency. Getting a gym contract is a person’s decision to exercise. Yet, when the morning comes numerous excuses can be used why not visiting the gym is an acceptable alternative: the bed is just too comfortable, long working hours or it is too cold to name a few. No matter how good the intention, failure to follow through on one’s decision is more often than not a reality.

Therefore, initiatives have to be developed that will assist people in countering their laps in self-control and follow through on their initial decision. A variety of Behavioural Economics initiatives are available to counter this problem such as feedback, commitment contract, channel factors and framing (Thorpeirsson & Kawachi, 2013:188). Due to limited time, resources and its communication application, this study focused purely on Communication Framing.

1.4 RESEARCH STATEMENT

The purpose of this study was twofold. Firstly, it wanted to understand whether infrequent gym visitors (those who visited the gym less than 11 times a month) did so because of Dynamic Inconsistent decisions. Secondly, it was to see if communication framing could

change the behaviour of those that did fall into the Dynamic Inconsistency trap for the better.

1.5 RESEARCH OBJECTIVES

The following primary and secondary objectives was set for the study at hand:

1. Identify whether Dynamic Inconsistency contributed to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month).
 - a. Confirm that only those who visited the gym infrequently made Dynamic Inconsistent decisions.
 - b. Confirm that the frequent gym visitor did not make any Dynamic Inconsistent decisions.
2. Detect if negative goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.
 - a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.
 - b. Establish if negative-goal framed messages were more effective in changing behaviour than the positive goal-framed messages.
3. Detect if positive goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.
 - a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.
 - b. Establish if positive-goal framed messages were more effective in changing behaviour than the negative goal-framed messages.

1.6 ACADEMIC VALUE AND CONTRIBUTION OF THE STUDY

From a theoretical perspective, this study contributed a number of elements. It provided more insight into the workings of Dynamic Inconsistency in normal behaviour, unlike so

many studies that focus mostly on addictive behaviour (see section 1.3.3). It provided the basis for a Dynamic Inconsistency communication application, which has not been done before. In addition, it added to the relatively limited body of knowledge of real life evidence across a general population (see section 1.3.5). With regards to Communication Framing, most studies concentrated on how attitudes and perceptions are influenced and not how behaviour can be changed (Gallagher & Updegraff, 2012:114). This study therefore contributed to the limited knowledge available about actual behaviour change. Lastly, as King and Sallis (2009:287) states, research on physical activity promotion continues to be a vital and expanding field. This is particularly relevant for South Africa as no study dealing with physical activity, Dynamic Inconsistency and Communication Framing within a South African context could be found (see section 1.3.5).

From a practical perspective, this study provided substantial economic value for a country such as South Africa where expenditure on health related issues is ever increasing (see section 1.2). It also provided insight into how people's lack of exercise behaviour could be changed. This could not only assist organisations in the exercise industry with ideas about how to modify their current programmes, but it could also provide valuable insight to make societal health prevention communication campaigns more effective.

1.7 DELIMITATIONS OF THE STUDY

According to Simon (2011) delimitations can be described as the characteristics that limit the scope and define the boundaries of the study. The following section will subsequently provide the rules that guided the study.

1.7.1 The difference between physical activity and exercise

It must be noted that even though physical activity and exercise are usually used interchangeably, there are noticeable differences. Caspersen, Powell and Christenson (1985:128) define 'physical activity' as body movement that burns calories whether it is work, play, daily chores or travel. 'Exercise', on the other hand, is a subdivision of physical activity. It is "*planned, structured, repetitive and purpose driven in the sense that*

improvement or maintenance of one or more components of physical fitness is an objective” (Caspersen, Powell & Christenson, 1985:128).

Visiting the gym would subsequently be an example of planned exercise. It is structured in the sense that there are specific classes or machines available and people more often than not have specific dedicated times they go to the gym. This also represents the repetitive nature thereof. Lastly, people have a ‘becoming healthier’ goal, as they either want to lose or maintain their current weight. The research therefore focused on getting infrequent gym visitors to visit the gym more often.

1.7.2 Who could qualify for the study

The theoretical basis of this study could be applied to any physical activity or exercise scenario. However, only those who generally visited one of the leading health club chains in South Africa 11 times a month or less were included.

Only members who were free of chronic health issues such as asthma, heart disease and diabetes to name a few, were included in the study. In addition, an unbiased gender, race and age approach was followed, as the goal was to measure those who visited the gym less than 11 times a month.

As Phase One’s Exercise Consistency Questionnaire was administered via an online platform, the target population was automatically skewed towards LSM 6 to 10. These groups represent 91% of those who have accessed the Internet in the last seven days (AMPS, 2012b).

Only those with active cellular phone numbers were included in Phase Two.

1.7.3 Nature of the research

The research was conducted in a real-life setting in order to address the concern of having too many Behavioural Economic laboratory based studies.

Finally, even though Ory, Jordan and Bazzarre (2002:507) stipulate that interventions need a multi-level approach of individual, community, organisational and societal system integration, the study was only one-dimensional. It focused on framing in isolation due to system constraints. It did however provide a platform to test the strength of a single communication intervention.

1.8 RESEARCH DESIGN AND METHODOLOGY

A multi-method quantitative research approach was used due to the nature of the study. As the assumption was that those who didn't visit the health club partner's gym enough made the decision because of Dynamic Inconsistency, Communication Framing could only be applied once those individuals were identified. A two-phased research approach was therefore warranted.

The first phase was dedicated to all members of one of the leading South African health club chains. Even though the focus was on the infrequent gym visitor (those who generally visited the gym less than 11 times a month), those who exercised more were also included for comparative purposes. In addition, all participants had to be free of chronic diseases.

The newly developed Exercise Consistency Questionnaire was administered via an Internet survey, as it could be conducted over a large geographical location without any face-to-face contact. The questionnaire consisted of 27 questions that aimed to measure Dynamic Inconsistency. A simple coding system was used to code the respondents' answers. All 'yes' answers received a 1 rating, whereas 'no' received 0. A total score for all 27 questions were calculated per respondent after which they were ranked from high (high amount of Dynamic Inconsistent decisions) to low (limited Dynamic Inconsistent decisions). All respondents who could be classified as infrequent (exercising less than 11 times a month) with a Dynamic Inconsistency score above 0 (of whom there were 446) became the population of Phase Two. The newly identified gym population were then randomly divided into three groups.

A classic experiment was subsequently conducted in Phase Two. Two of the groups received a communication intervention while the third became the Control Group. The

intervention groups received a positive or negative framed message once a week, while the Control Group received nothing. In order to measure whether the interventions did indeed change behaviour, monthly membership card swipes were used. These card swipes were then statistically analysed in order to determine if any of the communication interventions had an effect.

1.9 DISSERTATION CHAPTER BREAKDOWN

Chapter one aimed to provide an overview of the study conducted – to paint the bigger picture. A host of topics were therefore discussed: the necessity of being active; the implications of not being active on the individual as well as a society; how communication have to change its emphasis to be more behavioural driven rather than attitudinal; how Behavioural Economics inspired communication has been applied to health issues with great behavioural change success; the main objectives of the study and the way in which the study aimed to answer the objectives.

Chapter two will provide a bit more detail about the Behavioural Economics school of thought, followed by its view on decision-making from a dual system perspective. Temptation, impulsivity and self-control or lack thereof is then a natural evolution. Its application within a gym related setting would be done throughout.

Chapter three looks at how two Behavioural Economic theories, Delayed Discounting and subsequently Dynamic Inconsistency, play a role within the context chapter two created. All these constructs are viewed through a 'gym-behaviour' lens.

Chapter four follows with a discussion about how these decisions can be influenced through a Behavioural Economics communication concept called Communication Framing. It discusses its place within communication theory, the different types of frames available, as well as the topics used within the framed messages.

Chapter five delves into the research methodology. It looks at the chosen research paradigm, as well as the broad research approach. It deals with how the research was conducted within Phase One and Two respectively and provides an overview of the

research design, research method, target population, sampling framework, measurement instrument and data collection and analyses strategy across both phases.

Chapter six provides information about the calculations and findings of the data collected from Phase One and Two.

Chapter seven presents the ethical considerations, as well as the validity and reliability measures taken within the study.

Lastly, chapter eight gives final conclusions and recommendations for future research.

CHAPTER 2: BEHAVIOURAL ECONOMICS' VIEW OF DECISION MAKING

Chapter outline:

The purpose of this chapter is to:

- Understand the essence of Behavioural Economics
- Understand decision making from a dual-system approach
- Discuss the concept of impulsivity
- Provide an overview of self-control

2.1 INTRODUCTION

The previous chapter gave a broad overview of the whole study. The following chapter however will focus on its theoretical foundation. A quick synopsis of Behavioural Economics and its key beliefs will be given, leading into the concept of decision-making. Decision-making will then be unpacked, as well as the impact of temptation on impulsivity and self-control. The chapter will therefore provide an in-depth look at how decision making works and how temptation becomes 'the big culprit' that determines whether people maintain self-control.

2.2 THE ESSENCE OF BEHAVIOURAL ECONOMICS

Traditional economics believe in the 'Homo Economicus' or the 'economic man'. He is calculating, rational, unemotional and focused on maximising his value propositions. Hence the reason why he makes decisions that is always in his best interest (Martin, 2010:97; Shah & Dawney, 2005:2; Mullainathan & Thaler, 2000:1). These individuals are superhuman with unlimited mental capacity, willpower and self-interest (Mullainathan & Thaler, 2000:3). Decisions are thus not difficult or complicated, as it is a simple comparison between the expected value of one type of behaviour over another (Martin, 2010:97).

The problem with these standard economic assumptions is that it does not coincide with cognitive and social psychologists' findings that describe an altogether more complicated

human being (Martin, 2010:97). Numerous studies have shown that people deviate from classical economic expectations in a regular and predictable way, as human beings are more often than not inaccurate and unrealistic (Alm, 2011:2; Just & Payne, 2009:47; Mullainathan & Thaler, 2000:1). People subsequently make decisions that prevent them from maximising their potential value (Finkelstein & Strombotne, 2010:1522), which is in contrast to standard economic predictions.

With traditional theories having so many shortfalls in terms of unrealistic analysis and expectations, enriched economic theories developed in the form of Behavioural Economics (Mullainathan & Thaler, 2000:3; Shah & Dawney, 2005:2). This approach is more accurate due to its assumptions being more realistic. Mullainathan and Thaler (2000:ii) and Smith and Monge, (2011:30) provide a summary of Behavioural Economics' three most important beliefs:

- *Limited cognitive abilities*: people can only handle a limited amount of information at a time.
- *Bounded self-interest*: people sacrifice their own best interest for the sake of others
- *Bounded willpower*: people make choices that are not necessarily beneficial for their future

Bounded willpower was of particular interest to this study, as it related to the bad choices people make. Choice implies making a decision between alternatives and with one of the objectives being to see if infrequent gym visitors decided not to go to gym because of Dynamic Inconsistency, understanding decision-making became important.

2.3 THE INNER-WORKINGS OF DECISION MAKING

Even though Bounded willpower is the most applicable Behavioural Economic belief, Bounded rationality also comes into play due to its influence on decision-making. It relates to Smith and Monge's (2011:32) belief that exercise plans have a high probability of failure, due to the brain being more likely to make satisfying decisions rather than optimising ones. The following section will provide clarity on why this is the case.

People can only handle a certain amount of information at a time due to the brain's limited information-processing capability (Thorgerirsson & Kawachi, 2013:185). As a result, the brain tries to be as efficient as possible when making decisions, by using conscious (deliberate) and subconscious (automatic) processes (Harries, 2010). Dual-processing theories and models provides a better understanding of the interplay between these two systems and consequently decision-making (Samson & Voyer, 2012:49).

2.3.1 Dual system approach in a nutshell

Dual-system or dual-process theorists claim that there are two distinct processes involved when making decisions, each with their own unique way of handling a cognitive task (Frankish, 2010:1). Numerous models and theories exist within each theoretical framework (Evans & Stanovich, 2013:224), but most models agree on the basic statement and the general properties of the two processes (Glöckner & Witteman, 2010:4).

The first process (System or Type 1 depending on the theory) is characterised by being quick, automatic, unconscious and effortless, requiring minimal energy to operate (Harries, 2010; Reyna & Brainerd, 2011:181). It uses intuitive thoughts and draws on associations that are formed through experiences (Samson & Voyer, 2012:48-49). Consequently, it can also be described as heuristic in nature (Frankish, 2010:1). This system has been termed the Automatic System by Thaler and Sunstein (2008:333) as it is more of a gut-reaction.

The second process (System or Type 2) has a low impulse-thinking capacity. It draws on rules that are acquired through culture or formal learning and are slow, controlled, and conscious (Harries, 2010; Reyna & Brainerd, 2011:181; Samson & Voyer, 2012:48-49). Because of its conscious thought, rule-based, analytical process (Frankish, 2010:1), Thaler and Sunstein (2008:333) calls it the Reflective system.

This school of thought has its fair share of critics. Many have highlighted the multitude of dual-processing theories and models, the vagueness of their definitions and the lack of coherence and consistency in the proposed cluster of attributes for the subconscious and conscious systems (Evans & Stanovich, 2013:224). Some also view it as too simplistic;

claiming that decision making is much more intricate than the dual process models suggest (Glöckner & Witteman, 2010:3).

These concerns are valid, but were acknowledged and addressed by the dual process theorists even before the critics raised it (Evans & Stanovich, 2013:224). Moreover, the issues are granular in nature. It's about how many processes are involved, whether the terminology is correct or about inconsistencies of attributes in the two systems. None, however, debate the subconscious and conscious processes at work in decision making, which is what this study was built on. All of the critique was therefore inconsequential for the study at hand.

The popularity of dual-process and dual system theories has increased over recent years. Consumer psychology in particular, found this theory useful and incorporated it into three theoretical strands: persuasion and attitude change, buying and consumption, judgment and decision-making (Samson & Voyer, 2012:49).

As the objective of this research was about getting people to decide on behaving differently, the latter was of particular interest.

2.3.2 Impulsive or rational: hot-cold dual system theory

A specific judgment and decision making theory under this school of thought is the hot-cold dual system, which suggests that decisions are either made in a hot (referred to as System 1) or cold state (System 2). The hot state can be described as the impatient system, which is reflexive and impulsive, and results in emotional preferences. The cold state, on the other hand, is the patient system that implements cool, analytical preferences through slow, episodic and strategic thinking (Berns *et al.*, 2007:4; Samson & Voyer, 2012:57). Accordingly, when making decisions in the cold state (System 2), the decision-maker is guided by forward-looking rational deliberations. Conversely, the hot state (System 1) is driven by narrow-minded instinctive needs (Berns *et al.*, 2007:4).

The story of Ulysses, told by Thaler and Sunstein (2012: 646), is a great example of the theory in action. According to the legend, Ulysses instructed his crew to fill their ears with

wax (cold state) so that they would not be tempted by the music that would seduce them to steer their ship into danger (hot state). As Ulysses wanted to enjoy the music, he asked his men to tie him to the mast (cold state). He wanted to avoid the risk of submitting to the temptation and steering the ship closer to the source of the music and ultimately into danger (hot state).

The theory's application has mostly been in buying and consumption situations, due to hot (impulsivity) or cold (self-control) states being prevalent (Samson & Voyer, 2012:57). However, it can also be applied to other impulsive and self-control situations (Dholakia, 2000:956). There is thus no reason why the same thinking cannot apply to making a decision to stay committed to visiting the gym more frequently.

2.3.3 Marrying the dual system approach with exercise

There are two brain-processes that come into play when making decisions. The '*thinking*' rational brain makes conscious decisions in a cold state. When a person takes out a gym contract; set their alarm for early the next morning in order to exercise before work; or pack a gym bag to stop at the gym on their way home, System 2 kicks into gear. Their rational side knows it is an important, necessary step to a healthy lifestyle. However, there is also the '*non-thinking*' irrational brain that makes impulsive decisions in a hot, emotional state. This could be the reason why a person would press snooze on their alarm clock or drive straight home - because System 1 took over. This thinking correlates with Bickel and Marsch (2001:83) who postulates that a lack of exercise is one of the behaviours that involves some amount of impulsivity.

The problem is therefore not the ability for planned behaviour (getting the gym contract, setting the alarm clock or packing a gym bag), but rather succumbing to impulsivity (not getting up to exercise when the alarm clock goes off, not stopping at the gym on the way home) (Hofmann, Friese & Strack, 2009:162). Evidently, the failure of self-control when faced with temptations can result in the decision to exercise taking a backseat (Baumeister & Tierney, 2011:2). Temptation and self-control is subsequently two key constructs that need to be unpacked.

2.4 WHY TEMPTATION LEADS PEOPLE ASTRAY

In its simplest form, impulsivity is seen as enticement, allurements or seduction (Tang & Sutarso, 2012:3). A more process-driven definition states that it is an impulse to behave in a way which one fully expects to regret at a later stage (Magen & Gross, 2010:336). DeKel, Lipman and Rustichini (2009:937) provide a summarised explanation: impulsivity is when a person wants to choose something that they know will be at odds with their other desires. Clearly then, temptation is a negative experience as it is an appealing, sudden, often powerful persistent urge or impulse which results in conflicting emotions. It is characterised by little deliberation (Dholakia, 2000:957) and primes or directs thought towards impulsive action (Nordgren & Chou, 2011:1387).

Impulsivity is thus a result of surrendering to temptation and needs to be taken into account when dealing with the infrequent gym visitor. Only once the psychological workings of this type of decision-making are understood, can communication interventions be developed to prevent harmful behaviours (Dholakia, 2000:956).

2.5 IMPULSIVITY: SAYING YES WHEN YOU SHOULD SAY NO

Most impulsive definitions agree that the instant is chosen over the long-term (Samson & Voyer, 2012:56; Diekhof *et al.*, 2012:2769; Simpson & Vuchinich, 2000:3). However, other definitions highlight different attributes of impulsivity. Samson and Voyer, (2012:56) focus on the instant gratification need that drives spontaneous behaviour. Diekhof *et al.* (2012:2769) also emphasise the immediate reward aspect, but includes how it negatively affects a person's ability to plan ahead due to their heightened levels of impatience. Simpson and Vuchinich (2000:3) build on the latter definition, but draws further attention to how temptation results in a person's long-term best interest taking a 'back seat'. Tsukayama, Duckworth and Kim (2012:319), however, define it quite differently as they emphasise the failure of bringing one's behaviour in line with the persons ideals, values, morals and social expectations.

Consequently, impulsivity can be defined as an instantly gratifying decision that affects a person's ability to plan ahead due to their heightened levels of impatience. This then

results in behaviour that is not in line with an individual's own ideals, values, morals, social expectations and subsequent own best interest.

Yet, impulsivity is not a character trait that is evident in every situation. Tiger Woods is case in point. He was self-disciplined in many areas of his life e.g. practising golf, no drinking, no drugs, no smoking and yet he was impulsive when it came to extramarital affairs. Why? Because he had a weakness and lacked self-control in that particular area. Beecher's quote sums up the dilemma: "*All men are tempted. There is no man that lives that can't be broken down, provided it is the right temptation, put in the right spot.*" (Tsukayama *et al.*: 2012:318).

Visiting the gym for the infrequent gym visitor can also fall within this category. Some people might be well disciplined in some areas of their lives, but when it comes to exercise they make the decision not to visit the gym as much as they planned they would.

Self-control is thus a demanding trait that needs attention, self-discipline and willpower, and must come into play when temptations emerge (Samson & Voyer, 2012:56). The goal is therefore to understand self-control in order to come up with a communication intervention that will help the infrequent gym visitor of the health club partner to visit the gym as much as they planned to when they got the gym contract in the first place.

2.6 SELFCONTROL: ATTEMPT TO RESIST THE IRRESISTABLE

A self-control dilemma emerges when the Automatic System (System 1) and Reflective System (System 2) are not aligned. This particularly happens when a temptation goes against a person's long-term goal and self-control gets deployed to resist it (Berns *et al.*, 2007:4). Consequently, friction develops between the temptation and the motivation for control (Samson & Voyer, 2012:56).

Self-control is then the ability to resist existing urges or temptations that would otherwise lead to impulsive behaviour (Lades, 2012:2). The same sentiment is echoed by Hofmann *et al.* (2009:162) who define it as the capacity to override or prevent unwanted behavioural tendencies, such as temptations, to lead to actions. Diekhof *et al* (2012:2769) link self-

control to the avoidance of problematic reward options, even though it might be the reward of choice. Berns *et al.* (2007:3), however, sees self-control as being more complex, as it refers to a tension “*that people experience when they attempt to implement a far-sighted decision in the presence of immediate temptation.*”

All of these definitions can be summarised as follows: self-control is the ability to resist desired impulses or temptations, which would otherwise lead to the failure of implementing a far-sighted decision.

Resistance, however, is extremely difficult, as people are torn between achieving their long-term goals and the instant fulfilment. The impulsive choice brings immediate hedonic or pleasurable gratification, while the negative consequences are delayed. For example, to sleep a little bit longer instead of exercising brings immediate pleasure, but also regret and potential health problems in the future. The self-controlled choice brings greater value, but only after some delay, for instance exercising now brings no immediate pleasure, but better physical health later on (Hofmann *et al.*, 2009:162; Tsukayama *et al.*, 2012:319).

It becomes clear that an immediately gratifying alternative can make it difficult to wait for a delayed reward (Berns *et al.*, 2007:3). A Behavioural Economics theory called Delayed Discounting (also termed time perspective, temporal discounting and inter-temporal choice) (Daugherty & Brase, 2010:202) can shed more light on this struggle between immediate pleasure and future reward.

2.7 CONCLUSION

This chapter aimed to provide an overview of Behavioural Economics and its applications. Behavioural Economics provides economic theories that incorporate the psychological limitations of being human into decision-making. It subsequently provides a more realistic approach to decision making compared to traditional economics.

The aim was thus to provide insight into the intricate process of decision-making. It focused specifically on the hot-cold dual process system, which postulates that people make rational, thought-through decisions in a ‘cold’ state by making use of System 2 brain

processes. The moment any of the instinctual or emotional states set in, decisions are made in the 'hot' state, due to the System 1 brain processes thus fast, intuitively and without much thinking take over.

The assumption is that when people decide to exercise, the decision is made in the 'cold' state. The moment they decide impulsively, not to follow through on the decision, as in the case of switching off the alarm clock to sleep a bit longer, the 'hot' state takes over. Their self-control and consequently their willpower fail them due to the temptation being too strong to resist.

The following chapter will subsequently focus on a Behavioural Economics theory called Delayed Discounting, which can explain why people struggle with self-control when faced with temptation.

CHAPTER 3: UNDERSTANDING SELF-CONTROL AND TEMPTATION WITH THE HELP OF BEHAVIOURAL ECONOMIC THEORIES

Chapter outline:

The purpose of this chapter is to:

- Review the inner workings of the Behavioural Economic theory Delayed Discounting.
- Understand Dynamic Consistency and its interplay with Backward Induction and Decision Trees.
- Delve into the intricacies of Dynamic Inconsistency, including the 'Multiple Self' construct.
- Provide a theoretical application to the study at hand.

3.1 INTRODUCTION

Chapter two provided a sound foundation of the intricacies of decision-making, which include how temptation could result in a loss of self-control, even though one's intention was to resist it. It is therefore important to understand why temptation can result in the loss of self-control, as it impacts directly on this study. Having a gym contract is the decision to be healthier. Why then not make use of it? An attempt will be made to understand this conundrum through the Behavioural Economic lens of Delayed Discounting and a related theory called Dynamic Inconsistency, which is an integral part of the first research objective.

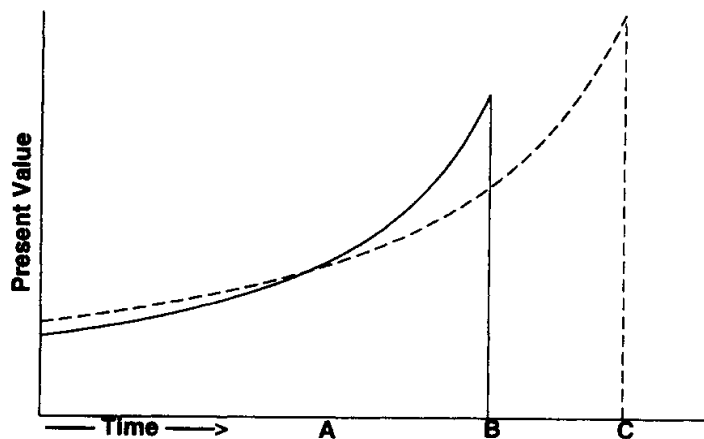
3.2 DELAYED DISCOUNTING: THE INSTANT OR THE FUTURE?

Delayed Discounting, in this context, is a Behavioural Economics measure of impulsivity that reflects one's capacity to delay pleasure (MacKillop *et al.*, 2012:20). The basic theory asserts that people prefer rewards that arrive sooner rather than later, as the value of a reward is perceived to decrease the longer a person has to wait for it (Kirby & Maraković, 1996:100; Smith & Monge, 2011:30). MacKillop *et al.* (2012:2) echoes this sentiment and adds that Delayed Discounting is a form of impulsivity that can be characterised by "*how much a person devalues a reward, based on its delay in time*". This in turn, indicates a person's capability or incapability to delay gratification. Teck *et al.* (2006:315) adds

another dimension by suggesting that people do have the ability to realise the impact their decision will have on the future when making trade-offs (now vs. later), yet they will more often than not opt for the immediate gratification when it is available. Foxall, Doyle and Yani-de-Soriano (2011:599) takes it one step further by incorporating the size of the reward – people prefer a smaller reward that is available immediately or relatively soon compared to a larger reward that is delayed.

All of the above definitions therefore agree that Delayed Discounting is a form of impulsivity. People prefer the instant to the long-term because the value of the future reward decreases the longer one has to wait for it. The result: the smaller immediate reward becomes the chosen one. Kirby, Petry and Bickel (1999:79) provide a visual representation of this Delayed Discounting theory in Figure 2.

Figure 2: A visual representation of the Delayed Discounting theory, indicating how people will choose the sooner, smaller reward the longer they have to wait for the bigger, future reward.



The illustration shows Delayed Discounting to be a hyperbolic function whereby the instant-gratification thought process eventually crosses the initial decision, depending on the time lapsed. If one were offered a choice between a smaller, sooner reward (point B) and a larger, later reward (point C), a person would choose the larger, later reward. Over time however the sooner, smaller reward becomes more attractive, up to the point where preference reversal takes place (point A) and the person chooses the smaller instant reward (Green & Myerson, 2004:770; Kirby *et al.*, 1999:79). It consequently reflects a

relative thoughtlessness to delayed consequences, as the costs of the ‘instant’ decision is not taken into consideration (de Wit, Flory, Acheson, McCloskey & Manuck, 2007:112).

Thus, Delayed Discounting highlights the tug of war between long-term intentions and short-term temptations and can be applied to a variety of choices. It can relate to something trivial such as how much to dish up, right through to life changing decisions in the form of spending, investments, diet, relationships, crime and education (Berns *et al.*, 2007:1). It is particularly relevant to situations that have an immediate cost coupled with delayed benefits such as exercise, or immediate benefits coupled with delayed costs such as drinking alcohol, doing drugs, smoking or eating (Simpson & Vuchinich, 2000:5; Teck *et al.*, 2006:317).

Delayed Discounting was subsequently the right foundation to assess why the majority of the South African gym population did not exercise enough. However, as the study’s first objective was to investigate why the health club partner’s infrequent gym visitors, who committed themselves to exercise by getting a contract did not follow through on their decision, the concept had to be taken a step further. In order to gain more insight into this phenomenon, an extension of Delayed Discounting, namely Dynamic Inconsistency, also known as time inconsistency (Black, Hashimzade, Myles & Myles, 2012:118, Brocas, 2011:343), needs to be understood.

3.3 DYNAMIC CONSISTENCY: STICKING TO THE PLAN

In order to truly understand Dynamic Inconsistency an enquiry into its antithesis, Dynamic Consistency, is required. Busemeyer, Wang and Shiffrin (2012:2) describe this phenomenon as being a planned action in the future that happens when the future becomes the present. Barkan and Busemeyer (1999:546) are much firmer by calling it an “*obligation to carry out the plan*” in order to experience the expected results on which the plan was based. Baron (1993:[4]) define it in a similar way by stating that a future decision of what to do in a particular situation should not change when the future becomes the present. However the author takes it one step further by incorporating contingencies. He postulates that plans should be made in advance, for any potential event that could get in

the way of reaching the future decision. Planning ahead is subsequently an integral part of Dynamic Consistency according to Baron.

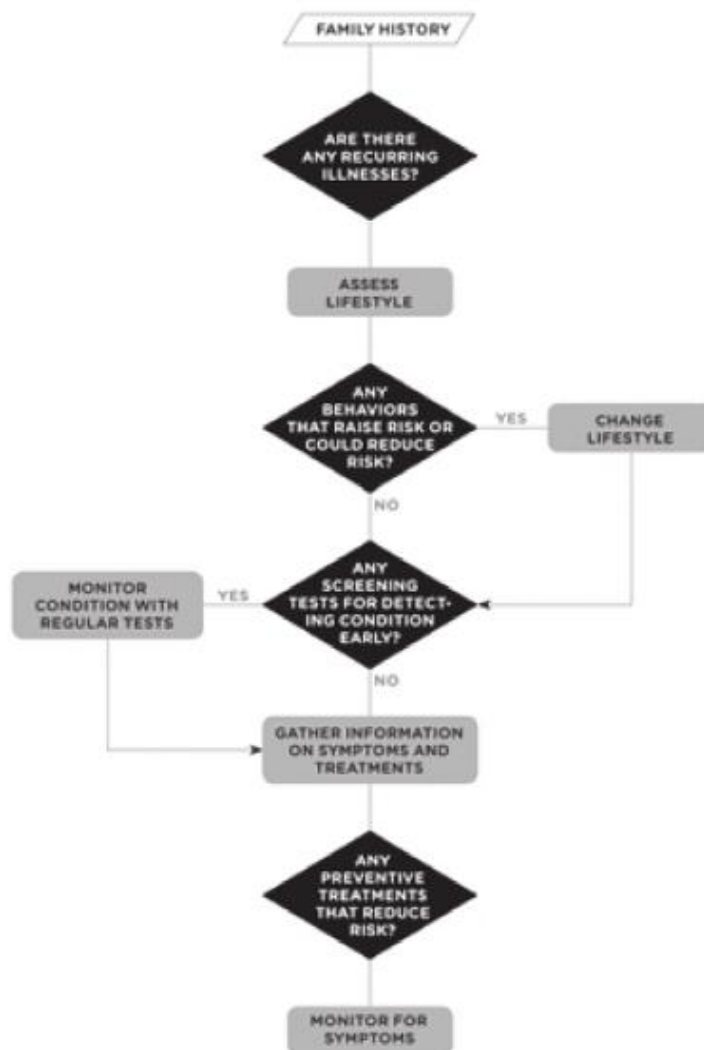
All three definitions agree that Dynamic Consistency is all about sticking to your original decision when the future becomes the present. To do this, based on Baron's definition, one needs to have decision contingencies in place to ensure the planned decision will take place.

This process of panning ahead for eventualities is called Backward Induction and is a fundamental principle of Dynamic Consistency (Johnson & Busemeyer, 2001:217). It is when an individual devises a plan to get to their preferred outcome, while anticipating future chance events (Barkan & Busemeyer, 1999:456). It requires the decision maker to connect values and likelihoods to future outcomes, calculate the expected value of the different options or paths, and choose the one that will deliver the most value for them (Barkan & Busemeyer, 2003:235).

This construct particularly comes into play with multiple stage decision-making events and is usually represented within a Decision Tree that depicts the different paths one could take (Barkan & Busemeyer, 1999:456). The goal of a decision tree is to identify problem areas and develop tactics to counter them in order to solve a particular problem (Greer, 2002:58). Goetz (2011:xiii) simplifies it by stating, "a Decision Tree is simply a tool that nudges us to think through our options, to act consciously and with consideration". In essence, develop plans in advance to resist the temptations that could derail the original decision in future.

There are a host of Decision Tree methodologies available. From algorithm complexity (Barros, de Carvalho & Freitas, 2015:7), to game based decision models (Barkan & Busemeyer, 2003:235) or even simple ones like writing pros and cons on a piece of paper (Goetz (2011:xiii). An example of a decision making tree was given by Goetz (2011:xv) and focused on how thinking actively about health concerns and choices, could assist in making better decisions (see Figure 3).

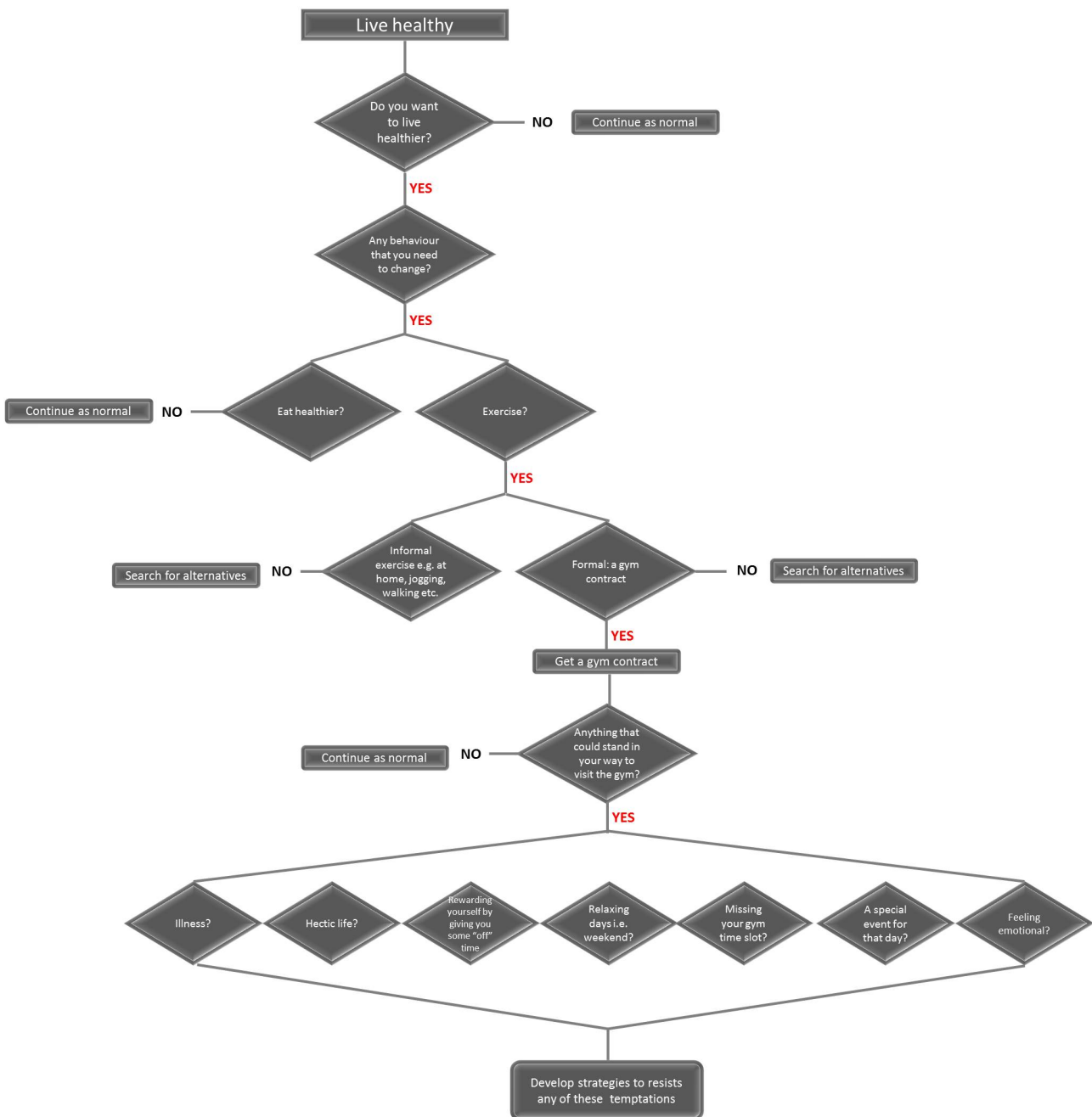
Figure 3: A visual representation of a health related decision tree developed by Goetz (2011:XV)



All the above principles could apply to the study at hand. An individual decides they want to be healthier. Instead of trying an informal exercise method e.g. walking, jogging etc., they decide on a formal method - a gym membership. Because sticking to an exercise plan is difficult, the individual realises that various temptations could stand in their way to follow through on their original decision. These temptations could be anything from the daily challenges and demands of life (Goldhaber-Fiebert & Garber, 2011), instinctual influences associated with emotion or distress such as exhaustion, hunger, thirst, pain or stress, or even alternative focus or using willpower on another situation can make people reassess their initial decision in an instant (Berns, *et al.*, 2007:3; Chance *et al.*, 2012:15).

In order to ensure these consciences individuals make the right choice, they formulate strategies that will be deployed when one of these temptations arise so that they do not reassess their initial decision. This example can be plotted in a decision tree as can be seen in Figure 4. The Goets format was used due to the fact that it was applied to health related decisions.

Figure 4: A visual representation of a gym related decision tree



Potential temptations were incorporated into the decision tree, all of which could fit into one of the categories mentioned by the various authors in the above example. As the final block in the Decision Tree states, strategies should be developed to assist the individual to maintain self-control by continuing to visit the gym. A variety can be deployed according to Smith and Monge (2011:31,33). Personal training sessions, weight loss and positive image programs in the media or exercise tracing devices such as pulse watches and running monitors are just some examples.

The problem with this perspective however is that people are not always rational and do not always pursue the best possible outcome (Smith & Monge, 2011:30). Backward Induction and Decision Trees would not always be followed even though a plan for every contingency was made. The right choices will thus not always take place, resulting in a deviation from the original decision (Dixon-Fyle & Kowallik, 2009:64). It is at this point where Dynamic Inconsistency comes into play.

3.4 DYNAMIC INCONSISTENCY: STRAYING FROM TO THE PLAN

Dynamic Inconsistency occurs when individuals deviate from choices they preferred at a point in time, when offered the option to revise it at the moment when the actual choice takes place (Attema, Bleichrodt, Rohde & Wakker, 2010:2015). Simply stated, it is when preference reversal takes place over time (Chapman & Elstein, 1995:375). Laibson (1997:445) builds on this notion by describing it as the problem of wanting to do something in the future, but failing to do so when the future becomes the present. Chapman and Elstein (1995:375) use the following example to bring it to life. In the evening, one resolves to get up early to reap the long-term reward of a good day's work, but when morning comes, one's preference switches to the short-term reward of sleeping in.

Dynamic Inconsistency is therefore when people have good intentions. A decision is made about a far-sighted course of action (getting up early to put in a good day's work or visit the gym), but is not followed through on because the individual succumbed to the temptation in the moment of having to take action (sleeping in).

This decision reversal phenomenon happens in various situations, from credit card spending, to nutrition and even exercise (Berns *et al.*, 2007:3). Goldhaber-Fiebert, Blumenkranz and Garber (2010:4) concurs with Berns *et al.* but take it one step further. They postulate that making the initial decision to exercise for three months to improve one's health is easier than making the daily decision to follow through on it. One would think it would be the opposite, except when a better understanding of a person's psyche is gained.

3.4.1 Battle of the selves

A person who makes a Dynamic Inconsistent decision can be viewed as being formed by various selves (Black, Hashimzade, Myles & Myles, 2012:118). These selves represents the decision maker in a specific point in time e.g. the self of today, tomorrow or next year, all of whom will have different views that effects the person's decision in that specific moment (Cram101 Textbook Reviews, 2012:[15]). This translates into a person having a series of selves, all of who have conflicting goals at a specific time (Brocas, 2011:343). As Heshmat (2015:[110]) states "*individuals are simply collections of different selves at odds with one another*".

These conflicting goals results in intra-personal conflict where one of the selves are the victor at a specific point in time, meaning its decision preference prevailed even if it goes against the initial decision (Brocas, 2011:343). The essence of a self-control problem is thus mainly about conflict of the different selves e.g. one wants to be thin, while the other wants to eat (Heshmat, 2015:[110]). The question however is what creates this conflict between the different selves? The struggle between temptation and self-control, which means 'hot' or System 1 and 'cold' states or System 2 come into play from the decision literature discussed in chapter 2.

The early self, who made the good future decision ('cold' state/System 2), wants to force its preference on the later self, while the later self ('hot' state/System 1) will do exactly the same for its point of view that goes against the future decision (Angeletos, Laibson, Repetto, Tobacman & Weinberg, 2003:522). Heshmat (2005:[110]) describe it as a constant battle for control between the different selves ('hot' versus 'cold states; System 1

versus System 2). He continues by stating that the “Doers” (in other words the later self) wants to get the immediate pleasure, while the “Planners” (the early self) wants to see the future goal come to fruition. A struggle between temptation and self–control therefore ensues (Brocas, 2011:343). There is subsequently no guarantee that the initial goal will be achieved due to the struggle between these two selves, because who will ultimately win? (Heshmay, 2005:[110]).

The only way to resolve the conflict is what Brocas (2011:343) terms non-cooperative play between the selves. Each self (say the “Planner”) will act in its own best interest and will assume the other self (say the “Doer”) to do the same. The only way to break the conflict is for one of the selves to give in. If the temptation is too much to resist, the “Doer” (‘hot’ state/System 1) will succeed, while the “Planner” (‘cold’ state/system 2) would lose self-control and vice versa.

It is clear that even if a person intends to follow through on the initial plan, going as far as devising strategies to make sure they can resist temptation, it may not happen at the pivotal moment when the future becomes the present. This subsequently provides a lot of insight into why people, who do want to live healthier by getting a gym contract, become an infrequent gym visitor.

3.5 DELAYED DISCOUNTING AND DYNAMIC INCONSISTENCY IN ACTION: HEALTH RELATED BEHAVIOUR

Information about the dangers of an unhealthy lifestyle does not guarantee that someone will take the necessary preventive measures, because the benefits occur so far in the future that they seem of little value when compared to the immediate costs (Chapman & Elstein, 1995:373). Healthy choices in particular have shown that people often place a higher value on the present than the future, discounting both future costs and its benefits (Thorgeirsson & Kawachi, 2013:187). The reason for this is because individuals are not willing to give up immediate pleasurable activities (smoking, feasting or sunbathing) in favour of greater future rewards (e.g. less chance of cancer and diseases) (Daugherty & Brase, 2010:203). The “Doer” self clearly beats the “Planner” self, more often than not.

However, some individuals do realise the importance of healthy living, which includes exercise, and are motivated to act on it. The gym Decision Tree is a great example of someone who might have been part the spike in gym subscriptions during January (The New Age, 2013). They made the decision to act and planned to counter some of the temptations that might lead them astray from their original goal.

Yet, as time goes by, their attendance decline rapidly, as their commitment to their future goal diminishes. Intrapersonal conflict between the early (“Planner”) and later (“Doer”) selves’ escalates (Angeletos *et al.*, 2003:522) with the “Doer” becoming the victor more and more. This type of behaviour is a clear indication of Dynamic Inconsistency (Goldhaber-Fiebert & Garber, 2011:4).

It could then be argued that people who follow the impulsive decision not to visit the gym (‘hot’ state/System 1) even though they did set their alarm clock or planned to go to gym after work (‘cold’ state/System 2) discount the effect it will have on their future health. It further indicates that the “Doer” defeats the “Planner” as preference reversal takes place where they give in to the temptation of the immediate, smaller benefit (sleeping in or spending time with family) instead of staying the course as planned to reach the larger, future reward (better health). This assumption coincides with Smith and Monge (2011:32) who state that an exercise plan has a high probability of failure, because the immediate satisfaction is valued higher than future satisfaction. Dynamic Inconsistency is therefore a key element that needs to be addressed when aiming to get individuals to gym more often.

3.6 CONCLUSION

Delayed Discounting states that people are driven by the instant more so than the long-term, even after a commitment to a long-term goal has been made. Dynamic Consistency tries to plan for these preference reversals with Backward Induction and Decision Trees, where contingencies are created for every possible scenario. The original decision should in theory then be made.

The problem however is that the instant seems so much better in the moment, than the future more beneficial decision. Inner conflict develops between the self who represents

the future goal (“Planner”) and the self who focuses on the NOW (“Doer”). The “Planner” tries to make the “Doer” see that not giving in to the temptation is better for the future self, while the “Doer” tries to justify why the NOW is so much better than the later. This ties in directly to the hot-cold dual system theory discussed in chapter two. The ‘hot’ state run by System 1 brain processes, makes the “Doer” act impulsively, while the ‘cold’ state run by System 2 brain processes, make the “Planner” want to follow through on initial decisions made.

If a person then needs to make a decision between receiving an instant benefit such as sleeping in, or showing self-control by getting up and exercising, many people will choose the couple of extra minutes of sleep.

Something subsequently needs to be done in order to assist people in bolstering their self-control when faced with temptations that could lead to the “Doer” winning, resulting in Dynamic Inconsistent behaviour. As Dynamic Inconsistency seems to play a key role in infrequent gym visitors’ gym behaviour, the question is how can these types of decisions be influenced?

CHAPTER 4: USING COMMUNICATION FRAMING TO INFLUENCE DYNAMIC INCONSISTENT DECISIONS

Chapter outline:

The purpose of this chapter is to:

- Discuss Communication Framing in relation to communication theory
- Define the concept of message framing
- Provide an overview of the different types of message frames
- Determine whether positive or negative framed messages are more influential
- Identify the most effective message topics to use within these framed messages

4.1 INTRODUCTION

The struggle between sticking to a long-term beneficial decision and defaulting to an instantly gratifying one is clearly a problem. The magnitude of the issue comes to life when keeping in mind that close to 70% of gym members visit the gym monthly, yearly or less often (AMPS, 2012a). A possible explanation for this behaviour can be given by the impulsivity-related Behavioural Economics theory of Dynamic Inconsistency. This has been discussed at length in the previous chapter. There is subsequently a definite need for an intervention to assist infrequent gym visitors in making less Dynamic Inconsistency decisions. Numerous tactics could be deployed in the hope of influencing people's behaviour, however this study focuses on only one such tactic, called Communication Framing.

The goal of this chapter is to establish the foundation of Communication Framing within the Communication school of thought. The definition of Communication Framing will then be discussed, followed by the different types of frames available. The impact of a positive or negative framed message will be examined. The chapter will conclude with guidance about the most effective message topics.

4.2 COMMUNICATION FRAMING: FITTING INTO COMMUNICATION THEORY

Framing as a concept has been around for almost 80 years, yet only became truly popular in the mid 70's due to the efforts of Erving Goffman (Cornelissen & Werner, 2014:182). According to Littlejohn and Foss (2005:87-88) his application was anchored in the sociocultural tradition of communication theory, where theories addressed the ways in which understanding, norms, roles and rules are created through communication interactions (Littlejohn & Foss: 2005:45). All these expectations mentioned by Littlejohn and Foss, are socially constructed and not instinctive to a person (Baran & Davis, 2008:314).

The focus was therefore on how people portray themselves in social situations. Littlejohn and Foss (2005:87-88) claims that “*self-representation*” is based on how a specific situation gets framed internally, which result in the portrayal of a particular “*self*” that is fitting for the context. The authors provide the following example to describe this theory in action “*You probably do not behave the same way with your best friend as you do with your parents, and it is unlikely that the self you present to a professor is the same one you present at a party.*” The battle of the selves discussed within Dynamic Inconsistency clearly found its foundation within this communication theory even though it has evolved quite significantly since the 70's (see section 3.4)

In recent years this theory has started to incorporate some Behavioural Economic decision-making principles. Sanders, Flache, van der Vegt and van de Vliert (2006:144) still agree that people interpret and evaluate behaviour before they act. However the authors also consider the cognitive selection processes that take place in order to “define” or “frame” a decision-making situation. A frame is thus not always rational or objective, resulting in personal gain or social well being not necessarily being a priority when making a decision. The authors continue by stating that this subjective framing of a situation can subsequently trigger expectations and obligations that can lessen or even overrule the notion of making a decision with self-interest in mind. Echoes of the hot-cold dual system decision-making theory discussed in 2.3.3, as well as the “Doer” and the “Planner” discussed in Dynamic Inconsistency (section 3.4.1) can clearly be heard in Sanders, Flache, van der Vegt and van de Vliert's point of view.

Framing can thus be used as a way to help the brain frame a decision-making situation in a certain way that should elicit a specific behavioural response. As Sustain and Thaler states (2008:[150]) “*Choices depend, in part, on the way in which problems are stated*”.

Incorporating an adaptation of this theory into the Behavioural Economics arsenal was a no brainer (Cornelissen & Werner, 2014:182), as the literature thus far is peppered with Behavioural Economics considerations particularly the hot-cold dual system decision-making theory and the inner workings of Dynamic Inconsistency.

The Prospect theory became the modification lens for Behavioural Economics’ interpretation of framing (Gallagher & Updegraff, 2012:101). This classical approach to framing was concerned with the reflection effect: losses are associated with risky behaviour while gains with risk-averse behaviour (Elliott & Hayward, 1998:230). This approach evolved into a more tangible application as it is said to occur when a person’s preference for one option over the other is influenced by the manner in which the choices are presented – either positive or negative (Elliott & Hayward, 1998:230, Gallagher & Updegraff, 2012:101). This means that decision makers will respond differently to different, yet objectively equivalent descriptions of the same problem (Levin, Schneider & Gaethc, 1998:150). Framing could thus become a very powerful tool.

4.3 COMMUNICATION FRAMING: THE WAY SOMETHING IS SAID MATTERS

The use of framing within today’s society is simple: omitting or emphasising certain information in an event or idea, will result in a certain interpretation to be formed (Denton Jr., 2012:131). People’s view of a problem can hence be affected by how it is presented (El-Massah, 2013:26). The American poet William Carlos Williams (n.d.) summed it up perfectly: “*It’s not what you say that matters but the manner in which you say it*”. Framing can thus be defined as the different presentations of the same information, object or event (Gamliel & Herstein, 2012:1217).

The judgment and decision-making literature provides a more behaviour-impact focus in its definition. It suggests that when identical objects, information or events are presented in opposite ways, such as positive and negative, different behaviours will be observed

(Gallagher & Updegraff, 2012:101). Simply highlighting certain features over others can result in people behaving differently (Read & Frederick, 2012:575). Choice can therefore be designed in such a way that the communicator's preferred choice comes across as being more tempting (Just & Payne, 2009:50). El-Massah's (2013:26) study was the only one found to have a more intellectual approach to framing. According to this academic, framing is the collection of stories and stereotypes that result in mental-emotional filters. Individuals will then rely on these filters in order to understand and respond to different events.

With most literature agreeing about what Communication Framing entails, except for the last esoteric approach, the construct will be defined as follows: Communication Framing takes place when identical objects or events are presented in two opposing manners resulting in two opposing types of behaviours. Not only is this the definition that developed from the judgment and decision-making literature, but it is also the definition with the best communication application.

This meaning of framing is particularly important for health-related communication, because the representation of health information has a definite effect on how successful its uptake is (Dixon Fyle *et al*, 2010:67). Previous research substantiates this point by proving that conveying identical health related information through different frames result in one type being more effective than another (Gallagher & Updegraff, 2012:101). An investigation into the different types of framing options are consequently necessary.

4.4 COMMUNICATION FRAMING TYPES: THE WAYS OF SAYING THINGS

Based on Levin *et al*. (1998:149), framing can be classified into three types: risky choice, attribute and goal framing. Risky choice framing, however, is not applicable to health communication and will not be considered (Akl, Oxman, Herrin, Vist, Terrenato, Sperati, Costiniuk, Blank & Schünemann, 2011:4). Attribute and goal framing will be discussed in detail in order to determine which would be best suited for the study at hand. Levine *et al*., (1998:151) summarises the methodological differences between the two in Figure 5.

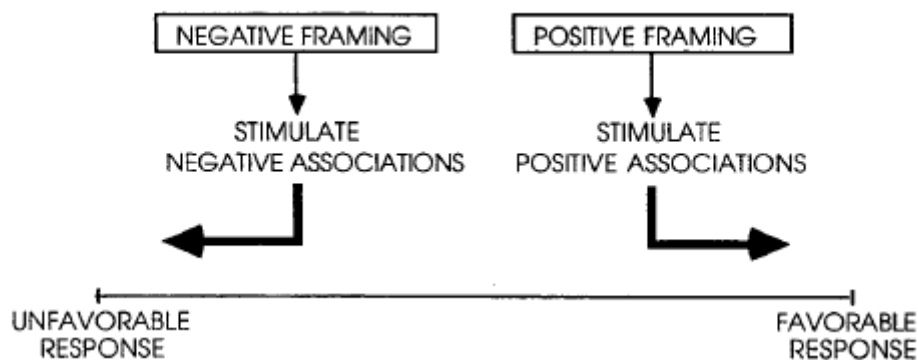
Figure 5: Summary of methodological and effect differences in attribute and goal framing.

Frame type	What is framed	What is affected	How effect is measured
Attribute	Object/event attributes or characteristics	Item evaluation	Comparison of attractiveness ratings for the single item
Goal	Consequence or implied goal of a behavior	Impact of persuasion	Comparison of rate of adoption of the behavior

4.4.1 Attribute framing: highlighting a characteristic

Attribute framing is one of the simplest forms of framing and emphasises a characteristic of an object or event through describing situations according to their success or failure rates (Levin *et al.*, 1998:150). It subsequently highlights the positive (e.g. “the chance of survival with cancer is 2/3”) or negative element (e.g. “the chance of mortality with cancer is 1/3”) of a specific topic (Akl *et al.*, 2011:4). Another example is provided in a study conducted by Levin and Gaeth (1988:374) where the goal was to ascertain which message related to the meat fat content, performed better. The “75% lean meat” product got more favourable reviews than products labelled “25% fat”. Therefore, this type of framing focuses on a specific attribute of an object or event and not the consequences (Levine *et al.*, 1998:151). Levin *et al.* (1998:150) provides a visual comparison between the positive and negative attribute frame approaches in figure 6.

Figure 6: Providing a visual representation of positive and negative attribute framing where the focus is on a measurable element.



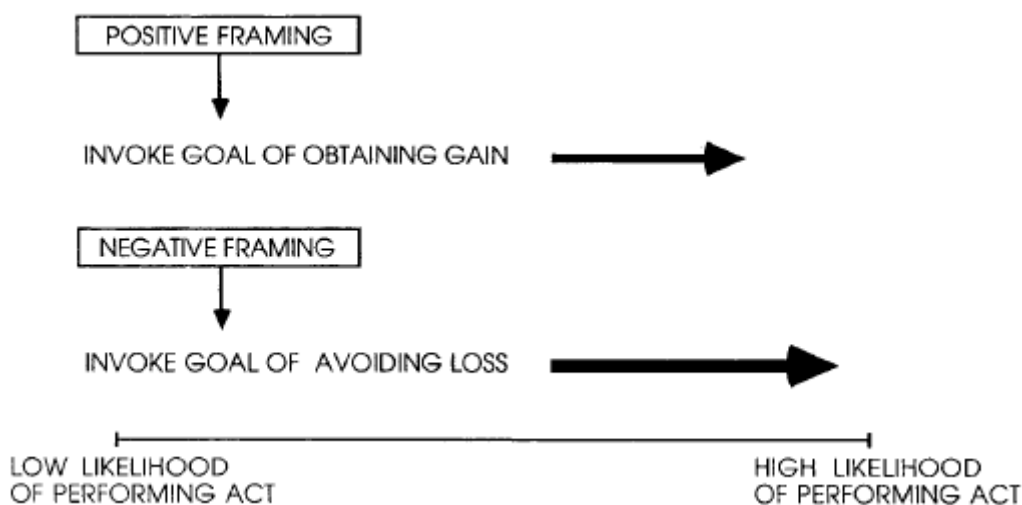
An example from an exercise perspective could be as follows: according to the President's Council on Fitness, Sports and Nutrition (2013), less than 5% of adults participate in 30 minutes of physical activity each day. This fact can be framed as follows:

- 5% of adults participate in 30 minutes of physical activity every day (positive attribute)
- 95% of adults do not participate in 30 minutes of physical activity every day (negative attribute).

4.4.2 Goal frame: highlighting a consequence

Goal framing is a negatively framed message emphasising losses, while a comparable positively framed message would emphasis gains (Akl *et al.*, 2011:4). This type of messaging thus focuses on either the negative consequences of not doing something (loss) or the positive consequences of doing it (gain) (Gamliel & Peer, 2010:12). Gallagher and Updegraff (2012:101) provide the following exercise related example. A gain-framed message aimed at increasing exercise might be “Exercising frequently can help you lose weight” while a loss-framed message might be “Not exercising frequently can make you gain weight.” Levine *et al.*, (1998:175) also provides a visual representation of goal framing in Figure 7.

Figure 7: Representation of basic goal framing processes where messages highlight the consequences of a specific action.



4.4.3 Which option is best?

Both framing options had merit for the study. The problem, however, with attribute framing was that it required some form of a ratio about a specific attribute, for example: one out of three or 95% of people do not exercise. This could become problematic, as limited scientific information about exercise was available in this format. Furthermore, the health club partner requested that only information that had been approved by biokineticists, be used. This made attribute framing even more challenging. Goal framing was subsequently chosen as the only framing type to test.

4.5 GOAL FRAMING OPTIONS: POSITIVE OR NEGATIVE

Goal framing provides a positive and negative option. The question however becomes: which option is most effective when it comes to exercise? Numerous studies have been done in order to answer this question.

Latimer *et al.* (2008:660 – 661) conducted an extensive literature review and found that positive messages should perform better; however, there was no conclusive proof. The authors state in no unequivocal terms “*The findings from the extant research suggest possible positive results from the use of gain-framed messages in promoting physical activity participation; however, more research is needed to account for the limitations of previous studies.*” As a result the authors performed their own research. They found that repeated exposure to gain-framed physical activity messages resulted in greater participation in exercise activities than loss- and mixed-framed messages (Latimer *et al.*, 2008:676).

A study done by Bartels, Kelly and Rothman (2010:821) indicates similar results. Their study shows that gain-framed messages were more effective in promoting preventive health behaviours. They went one step further and revealed that when risk associated with health behaviours was low, participants responded more favourable to positive-framed messages. Loss-framed messages, on the other hand, were more effective when promoting detection behaviours, therefore, when it involved the risk of finding a health problem.

Gallagher and Updegraff (2012:101) followed the same premise of Bartels *et al.* (2010); yet found that there was no significant advantage of a gain-framed message over a loss-framed message. The primary outcome of their study, however, was the change in attitude towards health behaviour or the intention to engage in behaviour. Actual behavioural change was thus not the key focus.

Even though there was a clear indication that positive framed messages would be more effective, all three these studies focused on testing both positive and negative framed messages. Only after the research was performed could they conclude which performed better. The same was therefore done in the study at hand. Both positive and negative goal-framed messages were tested in order to contribute to the body of knowledge already available on the topic.

4.6 WHAT TO SAY: CONSIDERING MESSAGE TOPICS

As the content of a negative or positive goal-framed message can be quite diverse, guidelines were needed to identify the message topics. According to Chance *et al.* (2012:8), distant future activities are viewed in a more abstract light, as the focus is on the bigger, philosophical purpose of the activity. When dealing with near future activities, the concrete properties, such as the process of the behaviour, is more important. The authors continued with an example of an individual thinking about going for a run that day. He or she will focus on concrete details, such as the temporary pleasure or pain they'll experience, what they will wear, where and for how long they will run, and how many calories they will burn. However, when considering a run next month, they are likely to focus on the abstract aspects, such as what it means to be a runner, what the long-term effects of exercise will be and why they have decided to run.

As the study focused on getting infrequent gym visitors to visit the gym more often immediately, both negative and positive goal-framed messages had to focus on the concrete properties. The detail of the process, such as the specific amount of time a person needed to exercise per week, became important, as opposed to the general importance of exercising.

4.7 CONCLUSION

This chapter aimed to anchor Communication Framing within the bigger Communication school of thought. It further intended to land the idea that a framing intervention could be deployed to help people be more consistent in their gym related decisions. Communication Framing, in the context of this study, was defined as the presentation of identical information in two opposing manners that resulted in different behaviours. Two types of framing, which could be relevant to exercise, were identified - attribute and goal framing. Yet the study only proceeded with goal framing, due to attribute framing having numerous insurmountable obstacles.

It further looked at whether positive- or negative goal-framed messages would be more effective. Positive framed messages seem to be the most effective within the context of exercise; however, as previous studies tested both, the study at hand did the same. The chapter concluded by identifying that all messages should focus on the concrete details of exercise instead of the philosophical future focused outcomes.

Having laid the theoretical foundation, the logistics of how the research was conducted becomes important. The following chapter will unpack the methodology and research design followed in the study.

CHAPTER 5: RESEARCH METHODOLOGY AND DESIGN

Chapter outline:

The purpose of this chapter is to:

- Identify the research paradigm used in the study
- Discuss the key assumptions of the chosen paradigm
- Define specific descriptors of the research
- Provide an overview of the research design
- Explain the research method for Phase One and Two
- Describe the target population for both phases
- Examine the sampling framework and approach
- Identify the measurement instruments for both phases
- Provide an overview of the data collection process
- Describe the steps taken in analysing the data

5.1 INTRODUCTION

Leedy and Ormrod (2013:7) state that methodology is the general approach researchers take in carrying out the research and dictates, to a certain extent, the particular tools used in the project. Research design on the other hand provides the detail of the specific data collection and analysis methods, as well as the reasons why a specific technique was chosen over another (Saunders *et al.*, 2012:680). This chapter will thus aim to provide the methodological direction, as well as the detail of how it will be done.

5.2 RESEARCH PARADIGM: THE OVERARCHING APPROACH

A research paradigm can be described as a worldview or theoretical lens that summarises the beliefs of researchers (Doyle, Brady & Byrne, 2009:177). These beliefs, and the resulting research approach, had to consider four core clusters: epistemology (how we know what we know), ontology (nature of reality), axiology (impact of values) and methodology (the process of research) (Hanson, Creswell, Clark, Petska, & Creswell,

2005:225). These foundational elements affect every aspect of the research process and dictates how a problem should be approached and investigated (Feilzer, 2009:2).

Even though there are a host of paradigms, the pragmatic paradigm was the most appropriate for the project and became the foundation of the research. The ontological, epistemological, axiology and methodological views of this paradigm, as well as the reasons why it was better suited for the study will be reviewed in the following sections.

5.2.1 Pragmatism's view of reality: ontology

Pragmatists, like positivists and realists, believe the world is external in nature and thus exists independently of people's minds (Pansiri, 2006:225; Saunders *et al.* 2012:140). Where pragmatists veer off onto their own path is their view on reality. Pragmatists believe in multiple realities (Giacobbi, Poczwardowski & Hager, 2005:20). This is because reality is created when a person has an experience, or rather, when the conscious has an encounter with the world (Kloppenber, 1996:104). Reality is therefore not something that is fixed to one view or objective, as positivist and realists believe, but rather something that is created through interaction (Saunders *et al.* 2012:140). Because, people are socially and historically situated (Cherryholmes, 1992:14; Giatsi Clausen, Nicol & Gill, 2010:2), each person's '*reality*' is unique to them, which leads to reality being subjective in nature (Beatty, Beatty & Dean, 2009:102).

This view is in stark contrast to the positivists, who believes in one reality that is fixed, identifiable, measurable and independent of social factors (Kotze, 2013a:10; Beatty *et al.*, 2009:102). If this were true, the need for this study would be null and void, as people would all visit the gym regularly. Due to the fact that individuals have their own social and historical context that can influence their gym behaviour (e.g. having two jobs, a sick child or a previous negative gym experience) one reality cannot exist.

5.2.2 Pragmatism's view of knowledge: epistemology

Pragmatists believe that knowledge is also contextual in nature and thus influenced by cultural, political and historical conditions of the day (Giacobbi *et al.*, 2005:21). Events and

objects will thus have multiple explanations because numerous ‘realities’ exist (Giatsi Clausen *et al.*, 2010:2).

But which ‘reality’ is better? Pragmatists maintain that no one knows, because grounded meaning and truth can never be determined once and for all. The focus is therefore not on finding absolute ‘truths’, but rather on seeking out alternative views, imposing one’s own ideas, and together coming up with a solution for the problem at hand. Whether everyone agrees with the ‘truth’ is irrelevant, as ‘truth’ is not measured against theory and opinions, but rather against actions taken. Observing the consequences is therefore the true measure of whether the belief reflects reality (Cherryholmes, 1992:15; Taatila & Raij, 2012:834).

This is very different to the more traditional views, such as positivism. This paradigm believes in rigorous and standardised procedures that will ensure objectivity. It also believes in the independence of the respondents in order to retain the credibility of the knowledge (Kotze, 2013:10). In essence, positivism aim to control as much as they can in order to ensure a perfect theory is proven time and time again. This is in total contrast to pragmatism. The goal of this research-study was not to test if theories like Delayed Discounting, Dynamic Inconsistency and Communication Framing took place in ‘real life’. The aim was rather to come up with a solution for a real life problem.

5.2.3 Pragmatism’s view of values: axiology

In a pragmatist’s view, values are relative and situational, just like reality and knowledge. This means that as a culture or situation changes, so does its values (Beatty *et al.*, 2009:101). Various methods should therefore be used to understand the world, because no single point of view can give the entire picture (Keleman & Rumens in Saunders *et al.*, 2012:130). For instance: people know they should visit the gym. If you asked them the night before whether they were planning on visiting the gym, they would probably have said yes, however, the next morning they would be nowhere to be seen. As the situation changed (going from a ‘cold’ to a ‘hot’ state, resulting in the “Planner-Doer” struggle), so did their values (i.e. from ‘I’m going to gym’ to ‘I’m sleeping in’).

5.2.4 Pragmatism's data collection approach: methodology

Due to reality and knowledge being multiple in nature, and values impacting the individuals being investigated, pragmatists believe a researcher should be free to use whatever works best in order to answer the research objectives (Doyle *et al.*, 2009:179). The pragmatists hence have an experimental and flexible approach to scientific work (Taatala & Raij, 2012:834).

The method design can subsequently be a mixed or multiple-method, which means a single study, could include both quantitative and qualitative techniques (Hanson *et al.*, 2005:226; Saunders *et al.*, 2012:140). The methods used are thus not dictated, as the goal is to collect credible, well-founded, reliable and relevant data, which will advance the research (Keleman & Rumens in Saunders *et al.*, 2012:130).

Pragmatists therefore focus on using the necessary methods and tools, as and when needed, in order to gain practical useful information. Allowing theories or worldviews to dictate a specific approach, which could constrain the process, is thus out of the question.

5.2.5 Pragmatism in summary

Pragmatism bypasses the contentious issues of truth and reality, by accepting philosophically that there are multiple realities that can be investigated in a real way. They also orient themselves toward solving practical problems in the “real world” as opposed to controlled environments (Feilzer, 2009:3).

The delivery of the best possible practical answer for a problem, guides their choice of method, or methods. Moreover, the success of research findings is evaluated based upon their practical, social and moral consequences, rather than to whether a specific theory was proven right or wrong (Giacobbi *et al.*, 2005:20).

This philosophical outlook was therefore a perfect fit for the research study, as a functional solution was needed for a practical problem: how could the partnering health club's

infrequent gym visitors, who made Dynamic Inconsistent decisions, become more frequent gym visitors?

With the methodology, or philosophical approach, of the research discussed, the practical side in the form of the research design had to be defined. The following descriptors became the guiding principles of the executional detail.

5.3 GENERAL DESCRIPTORS OF THE RESEARCH

- *Empirical study* – Empirical research is defined as research that involves the collection and analysis of new data (Leedy & Ormrod, 2013:5n). As the study used a two-phased approach to gain new insight into the impact Communication Framing had on Dynamic Inconsistent decisions, it was classified as an empirical study.
- *Primary data* – Due to the study collecting data directly from the population under investigation, primary data was gathered (Cargan, 2007:49).
- *Applied research* – When research has direct and immediate relevance to practitioners in such a way that they can understand and act upon it, it is called applied research (Saunders *et al.* 2012:665). With the project providing a practical solution to influencing the partnering health club's gym members' behaviour, applied research was undertaken.
- *Longitudinal research* – Longitudinal studies can be defined as investigations of a particular phenomenon over an extended period of time (Saunders *et al.* 2012:669). As the data collection of Phase One took place during February 2014 and Phase Two from mid-May to end-July 2014, the study was longitudinal in nature.
- *Evaluative study* – Research that tries to establish how successful the implementation of a policy or a particular project was in achieving its goal, is called an evaluative study (Cargan, 2007:7). Since the purpose of the overall research was to identify which intervention impacted the partnering health club's infrequent gym visitors who made gym related Dynamic Inconsistent decisions, the study was classified as an evaluative study.
- *Quantitative data* – In research, numerical information is known as quantitative data (Saunders *et al.*, 2012:678) and was the basis for both phases of this study due to it being quantifiable. Phase One indicated a definite 'yes' or 'no' conclusion (e.g. 'Was

the infrequent gym visitor of the health club partner making a Dynamic Inconsistent decisions or not?'), while Phase Two denoted 'best' or 'worst' outcomes (e.g. determining which intervention worked best: negative or positive communication framing).

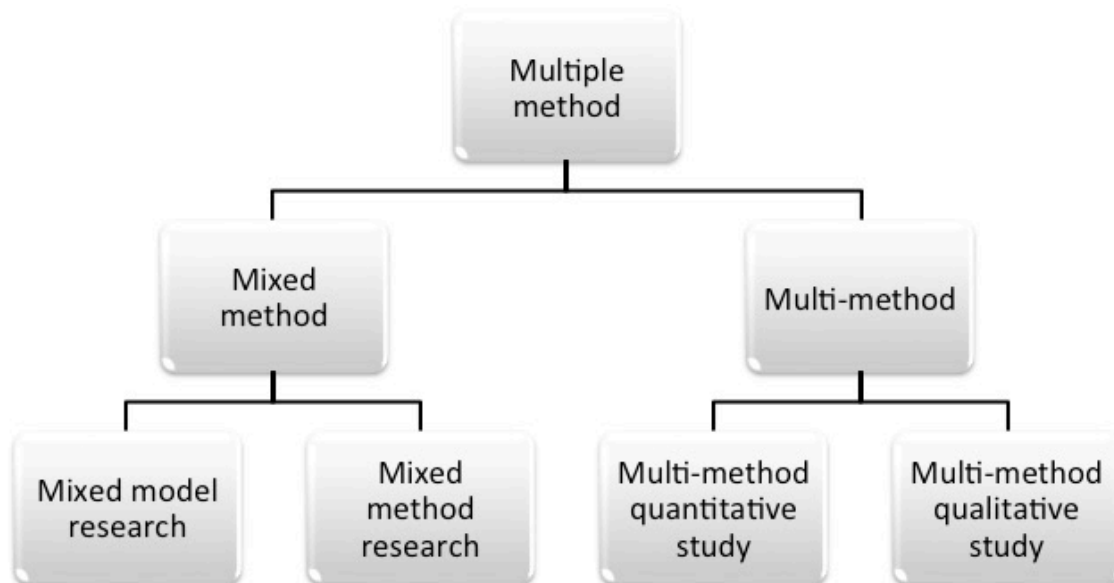
- *Descriptive study* – A descriptive study aims to produce an accurate representation of people, events or situations (Saunders *et al.* 2012:669) and was completed for Phase One. Reason being that a target population, made up of similar individuals (the partnering health club's infrequent gym visitor who made gym related Dynamic Inconsistent decisions), had to be identified.
- *Experimental study* – An experimental study was used in Phase Two, in order to randomly select and allocate the individuals selected in Phase One, to either one of the two experimental groups (receiving the intervention) or Control Group (not receiving the intervention) (Cargan, 2007:68).

5.4 RESEARCH DESIGN: THE BROAD RESEARCH APPROACH

When researchers collect data from more than one source, and make use of more than one type of analysis, a multiple-method research design is used (Davis, Golicic & Boerstler, 2011:468). According to the authors multiple method studies can employ two or more qualitative or quantitative methods or even a combination of both.

Saunders *et al.* (2012:165) agrees with the above authors, but expands on the notion of multiple method studies by separating it into two branches: mixed-method and multi-method. This can be seen in the visual representation of Figure 8 below.

Figure 8: The pragmatists have a variety of options available with regards to their research design, as it follows a multiple method approach.



When making use of a mixed method approach (the first branch in Figure 8), both quantitative and qualitative data are collected (Creswell, 2003:12). Creswell, Clark, Gutmann and Hanson (2003:165) agree by stating that this type of study involves the collection or analyses of both quantitative and/or qualitative data in a single study. Johnson and Onwuegbuzie (2004:17) on the other hand adds timing to this type of study, as it contains a quantitative phase and a qualitative phase. An example would be a project that uses an online survey that mostly have close-ended questions, but also have sections with open ended questions where respondents can give a response to the close-ended questions (Byrne & Humble, 2007:2).

A mixed model on the other hand also uses quantitative and qualitative methods, but it is included within or across different *stages* of the research process (Hartlep, n/d; Johnson & Onwuegbuzie, 2004:17). Byrne and Humble (2007:2) has a slightly different view in the sense that qualitative and quantitative projects are being mixed in more than one stage of the study. They provide the example of a researcher conducting surveys with a large group of individuals, while also conducting in-depth interviews with a sub-sample of those individuals.

Regardless of the type of mixed method used, the bottom line is that both methods apply qualitative and quantitative methods within their design. The current study only made use of quantitative methods, making analyses methods like triangulation unsuitable, as its goal is to substantiate findings by using two or more methods. In the words of Du Plooy (2009:41) “...*the main reasons for applying it are to test theoretical assumptions in more than one way.*”

The study at hand therefore made use of a multi-method quantitative study (second branch of Figure 8 because of the following.

5.4.1 The reason for a multi-method quantitative research approach

A multi-method research project consists of two or more interrelated studies, which build up to reach the overall research purpose. All of these studies are complete, in and of themselves, as each one aims to answer a particular research question (Morse, 2003:199). “*Results are reported separately, but the focus of the discussion is on the main study*” (Davis *et al.* 2011:469). In the context of this study, both phases were complete in and of themselves. Each phase subsequently needed separate research designs.

Phase One was focussed on achieving the first primary research objective: identify whether Dynamic Inconsistency contributed to the low gym attendance of the health club partner’s infrequent gym visitors. Phase Two, on the other hand, tried to answer the second and third research objective, whether the negative or positive goal-framed messages changed the behaviour of those infrequent gym visitor, who were found to make Dynamic Inconsistent decisions.

Each study within a multi-method approach has a specific weighting- and timing aspect (Davis *et al.* 2011:468). The weight dimension describes the project’s relative level of dependence on each method. It can either be equal or skewed to a particular method and reflects their relative importance in answering the research objectives (Creswall and Plano in Davis *et al.* 2011:468). As the study’s main focus was to see an increase in gym attendance in the partnering health club’s infrequent gym visitor who made Dynamic

Inconsistent gym related decisions, the research was equal, as Phase Two could not be done without Phase One and vice versa.

The timing dimension of this approach reflects the chronological order of using the data in answering the research objectives, and can either be sequential or concurrent (Creswall and Plano in Davis *et al.* 2011:468). Sequential timing means that the first method is used to collect, analyse and interpret the first data set before the second method is implemented. There are therefore two or more phases in sequential research designs (Davis *et al.* 2011:468). The study was subsequently sequential in nature, as Phase One had to take place in its entirety before Phase Two could be implemented.

Lastly, quantitative methods were utilised in Phase One and Two. Quantitative research aims to examine a situation as it is, by identifying the characteristics of an observed incident or exploring the possible associations between two or more incidences (Leedy & Ormrod, 2013:184). It further tries to describe, predict and explain quantities and to measure the degree of a relationship, while seeking to generalise the findings of a sample to the target population (Saunders *et al.*, 2012:95). This is done through the collection of numerical data (Du Plooy, 2009:87).

Both Phase One and Two made use of quantitative methods, however, these were applied in different ways. Phase One aimed to identify gym members from the health club partner who made gym related Dynamic Inconsistency decisions. A method that can measure a specific characteristic in a numerical way was subsequently needed. Phase Two on the other hand, tried to describe, predict and explain quantities of specific incidences. A numerical measure was again needed, yet now it had to indicate effectiveness, as it had to show whether people's gym behaviour changed.

With the research design determined, the methods used within each phase became important.

5.5 PHASE ONE RESEARCH METHOD

The following section will discuss the research type, its method, as well as the technique used in Phase One.

5.5.1 Research type: Descriptive

With this phase being a descriptive study, as mentioned in section 5.3, the aim was to measure one or more variables in some way (Leedy & Ormrod, 2013:191). Typically it involves measuring and describing a single variable, as it exists naturally instead of focusing on relationships between variables (Gravetter & Forzano, 2010:364). In general these types of studies address questions like how long and/or how often do certain events occur? To what extent does certain behaviour take place? In what numbers and/or proportions are certain characteristics present? (Sim & Wright, 2000:70). This however also becomes one of its key weaknesses as it only describes behaviour instead of investigating its causes (Gravetter & Forzano, 2010:372).

This was one of the main reasons why this strategy was chosen. Phase One aimed to identify and describe behaviour and not to investigate the cause. The strategy was also extremely useful as initial research (Gravetter & Forzano, 2010:364), making it perfect for Phase One, as it was laying the foundation for Phase Two.

5.5.2 Research method: Survey

Survey research is one of the design options in descriptive research and is quite popular due to observation of people not being required. The difference between a descriptive survey and any other research design survey is that it is conducted simply to obtain a description of a particular group of individuals (Gravetter & Forzano, 2010:364,373).

It must however be noted that survey results only capture a particular moment in time and can therefore not be seen as the everlasting truth. Moreover, the fact that the results are reliant on self-report data poses a risk. People may not be as insightful about their thoughts, feelings and behaviour as the researcher expects them to be. In addition, the

respondent might tell the researcher what he or she thinks the researcher wants to hear (Saunders *et al.*, 2012:177).

The first risk factor was mitigated through making use of an Internet survey. No researcher-respondent influence was therefore experienced as respondents answered the questions in the comfort of their own surroundings without the assistance of the researcher. The researcher did, however, need to rely on respondents' insights and memories of their previous gym behaviour, which is not an exact science. This subsequently became one of the study's weaknesses.

5.5.3 Research technique: Internet survey

The goal of Internet based survey platforms is to make survey administration easier, quicker and more cost effective when compared to other collection techniques (Jill & John, 2011:83). One of the most popular sites is Survey Monkey (Gravetter & Forzano, 2010:364,383) and was the platform used for this phase. Several pros and cons are associated with this type of data collection method and are summarised in Table 2 (Saunders *et al.*, 2012:421). The table also highlights the strategies implemented to counter these potential pitfalls:

Table 2: Attributes of Internet questionnaires and their counter strategies applicable to this study.

Attribute	Internet mediated questionnaire	Potential pitfall strategy (Where applicable)
Population's characteristics for which suitable	Computer literate individuals who have access to internet	All respondents had access to internet.
Confidence that right person has responded	High if using email	Targeted emails were sent to 10 000 health club members. A random number was assigned to each respondent for tracking and privacy protection purposes.
Likely response rate	11% or lower using internet	The sample size was increased due to the health club's response-rate being 5%

Size of sample	Large, can be geographically dispersed	Sample size was increased from 600 to 10 000 in order to get enough responses
Feasible length of questionnaire	6 to 8 A4 pages, minimise need to scroll down	Each question was on a separate screen - therefore no scrolling down.
Time taken to complete collection	2 – 6 weeks from distribution	Survey was sent out during the month of February 2014.
Suitable types of questions	Simple, closed ended questions. Must be of interest to respondent	Simple, close ended questions, following a “what would you do” formula, were used.

5.6 PHASE TWO RESEARCH METHOD

The following section will discuss the research type, its method, as well as the technique used in Phase Two.

5.6.1 Research type: Observational

According to Sapsford and Jupp (2006:60), an observational study does exactly as its name implies - it observes. The goal of such a study is to measure human behaviour in an accurate and objective manner through quantitative data. By focusing on the systematic observation, recording, description, analysis and interpretation of people’s behaviour, relationships between variables can be examined using experimental and statistical techniques (Saunders *et al.*, 2012:340; Sapsford & Jupp, 2006:60). This type of research is often used as a supportive or complementary method of collecting data, as it places data obtained by other means into perspective. It is subsequently regularly used in conjunction with other methods (Sapsford & Jupp, 2006:60).

As the goal of Phase Two was to understand if the interventions had a positive effect on the partnering health club’s infrequent gym visitors who made gym related Dynamic Inconsistent decisions, an observational study made the most sense. Moreover, this method was a perfect fit, as Phase Two aimed to give more perspective on the data obtained in Phase One.

Two types of observational studies are available: structured or unstructured (Neergaard & Ulhoi, 2007:411). Structured observation defines what to observe beforehand, how the observations will be recorded and possibly even how the observations will be analysed and interpreted. This is only possible if what is being measured, why it is being measured and where it is being observed, is clearly outlined (Lancaster, 2005:100). As the researcher knew exactly what was being measured (change in gym behaviour), why it was being measured (to see which intervention was most effective) and where it was being observed (in one of South Africa's leading health clubs) a structured observational study was done.

5.6.2 Research method: Experimental

An experimental method was chosen as the specific research strategy. This type of design is used when a researcher considers all possible factors that could cause or influence a particular condition or phenomenon. All influential factors are then controlled, except for those whose possible effects are the focus of the investigation. True experimental research subsequently manipulates the independent variable (the possible cause of an event or behaviour such as the two communication interventions). It then examines the effect on the dependent variable (that which is being affected, for instance gym behaviour) (Leedy & Ormrod, 2013:232).

Different types of experimental design strategies are available. The key focus for this phase, however, was a classical experiment, also known as the Pretest-posttest control group (Saunders *et al.*, 2012:175), randomised experiment or randomised controlled trial (Leedy & Ormrod, 2013:234).

A classic experiment works off of the premise of Experimental and Control Groups. These groups are carefully selected through appropriate randomisation techniques such as simple random sampling. The Experimental Group is firstly observed, exposed to experimental intervention and then observed again. The Control Group, on the other hand, is not exposed to any experimental treatment and is simply observed in line with the Experimental Group (Leedy & Ormrod, 2013:234).

In following this technique the target population had to be divided into three groups: two Experimental Groups (Positive Group and Negative Group) and one Control (Control Group). Each experimental group received one of the interventions i.e. the Positive Group received a positive goal-framed message, whilst the Negative Group received a negative goal-framed message. The Control Group received no intervention and was purely for observational purposes in order to determine which communication intervention (if any) worked best. With the inner working of the research strategy defined, a specific technique had to be selected.

5.6.3 Research technique: Text messages (sms)

The communication interventions were administered via opt-out text messages and managed by the health club partner in order to maintain the integrity and confidentiality of their database. Text messaging interventions are very beneficial with limited drawbacks. It's available on almost every mobile phone; relatively inexpensive; are used by most people and doesn't require great technological expertise. Lastly, it is suitable for behaviour change interventions, because it allows for "in the moment", personally tailored health communication and reinforcement (Cole-Lewis & Kershaw, 2010:56).

No information could be found on any drawbacks of this type of method; however, based on personal experience, sms overload can be an issue. As many companies use bulk text messages to communicate with their customers, people may experience sms fatigue and stop paying attention to the messages. However, as text messages do not have a subject line, as in the case of an email, individuals have to open it in order to see what it is about. They will therefore at least glance at it, which is better than just deleting it from the start.

Riley (2012:54) compiled a review on numerous health related interventions, which were done via mobile phones, and identified some lessons, which were incorporated into the study at hand. Firstly, text based interventions had a much higher frequency with much better in-context relevance due to its targeted nature. Messaging can be tailored, not only to a specific individual, but also to the time of day, week or month. Respondents received only one sms a week, specifically on a Monday, as the assumption was that people would be more motivated with the 'fresh start' at the beginning of a new week.

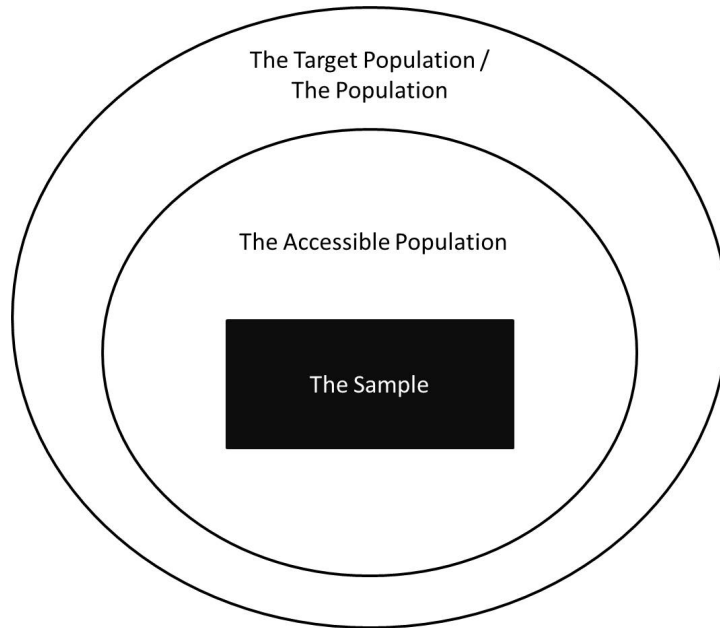
Secondly, interactivity levels within diet and physical activity studies varied. Some had non-tailored, weekly informational text messages, while others had real-time, diet and exercise monitoring, with multiple daily customized messages based on input (Riley, 2012:54). Unfortunately, due to system constraints, messages could not be tailored for real-time relevance. Weekly text messages were therefore sent. All messages were tailored for the specific intervention group i.e. a positive goal-framed message was sent to the Positive Group, whilst a negative goal-framed message was sent to the Negative Group. Respondents subsequently got exposure to four messages in a four-week period.

Lastly, the majority of diet and exercise interventions were more than 12 weeks (Riley, 2012:54). This also corresponds to Cole-Lewis and Kershaw (2010:56) who states that interventions range from 3 to 12 months. Due to time constraints the program could only run for the minimum three-month period.

5.7 TARGET POPULATION: WHO ARE WE LOOKING AT?

The definition of sampling was aptly described by du Plooy (2009:108) as a “*rigorous procedure when selecting units of analyses from a target, or accessible population*”. Within this simple explanation lie a couple of elements that need to be understood before the actual selection strategy or “rigorous procedure” can be discussed. The diagram developed by Gravetter and Forzano (2010:140) depict these elements in Figure 9, with the exception of the unit of analyses.

Figure 9: Showcasing the different elements that need to be considered before a sampling strategy can be deployed.



Firstly, the unit of analyses consists of the elements that make up a larger population. This can be anything from individuals, institutions, objects or even events (O’Leary, 2004:103). In the case of the study at hand, the unit of analyses was ‘individuals’.

The second element that needs an explanation is the notion of a population or a target population. A population can be defined as a complete set of cases, group members or the total universe from which a sample is pulled (Fink, 2003:1; Saunders *et al.* 2012:678). More importantly, it is the group of individuals to whom the results should be generalised (Du Plooy, 2009:109). However, in order to belong to a population, members need to have the same specific characteristics (Gravetter & Forzano, 2010:140).

The target population for Phase One was subsequently all members of one of the leading health club chains in South Africa, who were not being treated for any chronic diseases. Phase Two’s population however was the result of Phase One: infrequent gym visitors who made gym related Dynamic Inconsistent decisions. Phase Two was therefore a census as Du Plooy (2009:108) states, *“in order to collect accurate data about all the members of a target population, we could question, analyse and investigate every member. This is called a census”*.

The accessible population becomes the third element. Both Du Plooy (2009:109) and Gravetter and Forzano (2010:140) agree that the accessible population is made up of the units of analysis in the target population to which researchers has access. In this case, the target population and accessible population were one and the same, for both phases, due to the researcher's partnership with the afore mentioned health club.

5.8 SAMPLING: IDENTIFYING THE LUCKY FEW

A sample can be described as a portion of the larger population (Saunders *et al.* 2012:681). Fink (2003:1) provides a bit more depth by explaining that a sample is an identical, miniature version of the original population. Information is gathered from this portion of individuals with the goal to apply the findings to the broader target population (O'Leary, 2004:102). Identifying the correct sampling strategy is subsequently of utmost importance.

5.8.1 Sampling categories: the broader selection approach

Sampling can be divided into two broad categories called probability and non-probability sampling (Saunders *et al.*, 2012:261). Probability sampling was the approach of choice as it provided a statistical basis for claiming a sample to be representative of the accessible, or target population (Fink, 2003:9). This is of particular importance for studies that require a statistical measure of the characteristics of the population from the sample (Saunders *et al.*, 2012:261).

The selection process of this sampling category is the key element that sets it apart from non-probability sampling. It is completely left to chance (a random process), rather than to choice or judgment of the researcher (a non-random process) (Sim & Wright, 2000:113). This random selection process ensures that every individual in the target population has an equal chance of getting selected for the sample (Leedy & Ormrod, 2013:207). The result is a truly representative sample. This is the exact reason why it became the broad selection strategy of choice for both Phase One and Phase Two.

5.8.2 Sample size: the amount count

In order to conduct probability sampling successfully a suitable sample size had to be determined (Saunders *et al.*, 2012:262). This is extremely important, as it impacts whether effects can be estimated with precision and points out statistically significant differences, if any (Sim & Wright, 2000:32). Moreover, the correct sample size influences the validity and reliability of the results (Saunders *et al.*, 2012:659):

Getting the right number of people was essential, due to the results of Phase One becoming the population for Phase Two. The following formula was subsequently used to determine the correct size (Saunders *et al.*, 2012:659) for Phase One:

$$n = p\% \times q\% \times [z/e\%]^2$$

n	= minimum sample size required
p%	= percentage belonging to the specified category
q%	= percentage not belonging to the specified category
z	= level of confidence required
e%	= margin of error required

It is highly unlikely for all members of a sample to have a specified attribute (Saunders *et al.*, 2012:659). As a result, precautions were built in to ensure enough individuals had the specified attribute under investigation. Ideally, a pilot study of a minimum of 30 respondents had to be conducted in order to have a reasonable idea of the likely proportions (Saunders *et al.*, 2012:659). Due to time constraints, a proper pilot study for the correct measurement tool could not be conducted.

It is for this reason why the worst-case scenario of 50% was used. This means that at least 50% of individuals in the sample would have the specified gym related Dynamic Inconsistency attribute (Saunders *et al.*, 2012:659). The percentage belonging to the specific category (p%) was therefore 50% while the percentage not belonging to the specified category (q%) was also 50% (Saunders *et al.*, 2012:659, 660).

Level of confidence (z) is the estimated probability that a population parameter lies within a certain margin of error (e%) and is usually between one and five per cent (Babbie, 2008:219; Saunders *et al.*, 2012:266). This means that if 50% of the sample shows a specific attribute, you can be 95% sure that 50% of the total population will also show the specific attribute, give or take the one to five percentage margin of error (Saunders *et al.*, 2012:266). As most business and management research projects use a 95% confidence level with a three to five per cent margin of error (Saunders *et al.*, 2012:266), similar numbers were used: A 95% level of confidence and a 4% margin of error (e%). Each level of confidence has an associated z value, with 95% being 1.96 (z) (Saunders *et al.*, 2012:266). The minimum sample size was therefore calculated as follows:

$$\begin{aligned}n &= p\% \times q\% \times [z/e\%]^2 \\n &= 50 \times 50 \times [1.96/4]^2 \\n &= 50 \times 50 \times 0.2401 \\n &= 600.25\end{aligned}$$

The premise was thus if 600 individuals responded to Phase One's measurement tool, 300 would be prone to make gym related Dynamic Inconsistent decisions. This was, however, based on a 100% response rate assumption, yet the health club's response rate was only 5% (Patel, 2013). As a result, the sample had to be boosted to ensure sufficient responses were obtained (Saunders *et al.*, 2012:267). The health club partner subsequently recommended that the sample size should increase to 10 000.

Even though a census was being done in Phase Two, sampling size still had to be taken into consideration, as the population had to be divided into three unbiased, population represented groups. In order to analyse a sample or group statistically, a minimum of 30 individuals are necessary per group (Saunders *et al.* 2012:266). For repeatability, 30 are the bare minimum, 50 are adequate and 100 allows for precision, whilst more than a 100 is unnecessary (Peat, Mellis & Williams, 2002:143). Each group then had to be between 30 and 100.

With the sample size calculated for both phases, the process of identifying the actual sample could take place.

5.8.3 Sampling technique: the specific method

Simple random sampling is the most basic method of choosing a sample within the probability-sampling stable (Babbie, 2013:220). It involves selecting the sample at random from the population using either a computer or random number tables (Saunders *et al.*, 2012:273). Each member subsequently has an equal chance of being selected (Singh & Mangat, 1996:30).

This type of sampling was used in both Phase One and Phase Two, as it is best used when the population can be easily accessed, preferably online. It should however be avoided if face-to-face contact is needed across a large geographical area (Saunders *et al.*, 2012:273-274). Neither geography nor face-to-face contact was a concern due to the emails and text messages being used.

Phase One and Two made use of Excel to ensure that true randomness was achieved. Each member of the partnering health club population received a number in Phase One, which was 500 000, due to the total gym membership of the health club being close to this number (Shevel, 2011). A column of random numbers was then generated next to the numbered members by using the RAND function in Excel. The numbered members were then randomised based on the RAND column. The first 10 000 became the sample. Phase Two made use of this same technique, just on a much smaller scale due to the population being smaller.

5.9 PHASE ONE MEASUREMENT INSTRUMENT: MEASURING THE SELECTED FEW

The following section will describe the specific method chosen and developed to collect the numerical data.

5.9.1 Phase One: Measuring Dynamic Inconsistency

Finding measuring-instruments for Dynamic Inconsistency turned out to be more difficult than anticipated. According to Laibson (1997:451), a dynamic game, such as a gambling game, is standard practice. Attema *et al.* (2008:1), on the other hand, propose the use of a Time Trade-Off sequence, which is very similar to the Delayed Discounting measurement and the Kirby Delay Discounting Rate Monetary Choice Questionnaire (Kirby, Petry & Bickel, 1999:79), as both are designed around money trade-off in relation to time. A more recent development is the Hyperbolic Factor, which according to Rohde (2010:126) can provide interesting predictions for individual behaviour in categories such as smoking, exercising, dieting, and saving.

Finding an actual test for these different methods was near impossible, with only minimal guidelines being found for some methods. In spite of this, a bigger problem arose. All three of these methods did not relate to exercise directly, but rather to a monetary gain or loss. This was a big concern for the health club partner, as it connected the brand with either money or gambling type scenarios, which in their view, would affect their brand negatively.

Moreover, the one and only Delayed Discounting and exercise study conducted by Smith (2009:17), claimed that the Monetary Choice Questionnaire was one of the studies biggest weaknesses. To quote Smith (2009:17): *“Incongruence between the characteristics of exercise choice and monetary choice may have contributed to the current lack of findings.”* Basically, one cannot expect people to have the same approach to exercise as they do to money. Both these measurement tools were thus defective for the purpose of this study.

Yet the researcher still continued with pilot studies for both the Monetary Choice Questionnaire, as well as a dynamic game based one Barkan’s Sequential Gambling Paradigm (2003), as it was the two main methods to test Dynamic Inconsistency. Both these options delivered the same inconclusive results as in Smith’s study. It was therefore decided to develop a new measuring tool, specifically focused on assessing gym related Dynamic Inconsistency.

5.9.2 Measuring tool: the Exercise Consistency Questionnaire

Developing a questionnaire is perceived to be a relatively simple task. Yet, it is a much more involved, strategic task than most researchers anticipate. Numerous books (i.e. Brace, 2013; Bradburn, Sudman, S. & Wansink, B. 2004), chapters (i.e. Leedy & Ormrod 2013; Saunders *et al.*, 2012) and journal articles (i.e. Hofstee, 2013) are dedicated to developing questionnaires that will deliver usable and relevant data. As Brace (2013:1) states:

“It is clear to anyone undertaking data collection through a questionnaire survey, that the questionnaire is one of the most crucial elements in its success. You will only collect information that you ask for and the way you ask the questions will affect the type and accuracy of the responses you receive...the full importance of writing a good questionnaire is often underestimated. After all, anybody can write a set of questions can’t they? But if those questions are the wrong questions, poorly phrased or in the wrong order, the answers obtained may be worse than meaningless: they may be misleading.”

Every single question should therefore assist in uncovering whether gym related Dynamic Inconsistent decisions contributed to the health club partner’s infrequent gym visitor not visiting the gym. This was done through focusing on different types of ‘in the moment’ (‘hot’ state which result in conflict between the “Doer” and “Planner”) scenarios, which could be used as excuses for not following through on the exercise intention. As section 3.4.1 indicated, these scenarios could be anything from normal demands of life, to being emotional or distressed in some way, such as: hunger, thirst, pain, stress, alternative focus or even using willpower in other situations (Berns, *et al.*, 2007:3; Chance *et al.*, 2012:15).

A discussion-group investigation was conducted with lapsed users in order to identify these potential excuse-scenarios. Eight themes were identified and fitted into one of the above-mentioned factors that could result in choice reversal. These themes were: illness, hectic life, reward/escape, weather, relaxing, gym routine/experience, occasion/event and emotional state (see Appendix A). All questions highlighted a scenario within these categories, which could stand in the way of the individual following through on their decision to visit the health club partner’s gym regularly. The Exercise Consistency

Questionnaire therefore consisted of 27 short ‘yes or ‘no questions that took about five minutes to complete.

The second element that had to be incorporated was the phrasing of the questionnaire. Both the questions as well as the instructions’ wording were imperative. If either one of these were ambiguous, confusing or created the perception of time wasting, the response rate would have decreased even further (Brace, 2013:12; Leedy & Ormrod, 2013:197).

The questionnaire in its totality was subsequently extremely simple. The overview, ethical considerations and instructions, were clear and easy to understand and were already discussed in the email that was sent to all the potential participants of the partnering health club (see Appendix B). As a result, the questionnaire started immediately after respondents clicked on the link. In addition, the 27 questions were all category closed-ended, as respondents had specific answer options (‘yes’ and ‘no’) of which only one could be chosen (Saunders *et al.*, 2012:432).

The questionnaire further followed Eiselen’s (in Hofstee, 2013) advice. All questions were unambiguous, leaving no room for misunderstandings. Leading questions and emotional language were avoided in order to keep it neutral. Any question that could make the respondent feel guilty, or that made assumptions about the respondent, was further excluded from the questionnaire. Lastly, no hypothetical-situation questions were asked. All question topics were relatable and generic.

The last element that guided the questionnaire’s development was the order of the questions. According to Saunders *et al.* (2012:445), a questionnaire needs to start with straightforward questions that have direct relevance to the purpose of the questionnaire. More complex questions or topics had to be placed more to the middle of the questionnaire, whilst personal or sensitive questions had to be left to last. Eiselen (in Hofstee, 2013) goes one step further by stating that questions should not be structured in a specific pattern, as it could result in respondents answering the questions on autopilot instead of reading it properly. The researcher subsequently randomised the 27 questions, which were originally divided into eight themes. The ‘yes’ and ‘no’ options were also randomised.

See Appendix C for an example of the Exercise Consistency Questionnaire.

5.10 PHASE TWO MEASUREMENT INSTRUMENT: OBSERVING THE SELECTED FEW

Leedy and Ormrod (2013:185) provided guidance about how to conduct experimental research. Firstly, the behaviour being studied had to be defined in such a way that it would be easily recognisable when it occurred. Secondly, the observation period had to be divided into small segments in order to record whether the behaviour did or did not occur. And lastly, a rating scale evaluating the behaviour in terms of specific dimensions had to be used.

The three elements mentioned above were applied to the study at hand. As the goal was to determine whether the partnering health club's infrequent gym visitors visited the gym more often after being exposed to one of the two communication interventions, every gym and non-gym visit became observed behaviour. These behaviours were recorded over a three-month period by using membership card swipes (or the lack there of). This information was shared by the health club partner and became the measurement-tool of the different groups for the duration of the three-month communication intervention. In addition, the same time frame data of the previous year was shared so that each individual had their own comparative base line or rating scale to compare the new data to.

5.11 PHASE 1: DATA ANALYSES - IDENTIFYING THE IRINFREQUENT GYM VISITOR

Data obtained through the questionnaire had to be arranged in a clear, logical way. This is an important step as it affects the insights, which the data can reveal (Leedy & Ormrod, 2013:272). The goal therefore of the following section, is to discuss the strategy that was used to organise and subsequently analyse the raw data.

5.11.1 Identifying the workable respondent group

The raw data was received in an Excel spreadsheet. A total of 623 respondents answered the questionnaire in some way; however some had to be excluded, as they did not comply with the sample criteria. All chronic disease respondents (38 respondents) had to be omitted, as well as any uncompleted questionnaires (46 respondents). An additional 93 respondents had to be factored out as they exercised 12 times a month or more.

A workable sample of 446 individuals, who exercised less than 11 times a month at the partnering health club's gym, was therefore identified. This was slightly less than the anticipated sample size of 600 identified in section 5.8.2. However, the premise that only 50% of the sample would have some form of gym related Dynamic Inconsistency still had to be tested before any additional plans were implemented to increase the sample size. A simple coding method was subsequently deployed to identify the health club partner's infrequent gym visitors who made gym related Dynamic Inconsistent decisions.

5.12 PHASE 2: DATA ANALYSES – CHANGING THE BEHAVIOUR OF THE IRINFREQUENT GYM VISITOR

Before any kind of data analysis could be performed, it had to be classified, as the nature of data determines the kind of statistical analysis that can be performed (Leedy & Ormrod, 2013:278; Saunders *et al.*; 2012:475; Vaughan, 2001:1).

5.12.1 Classifying the data obtained

The first characteristic that had to be established was whether the data is continuous or discrete. The data could be classified as discrete as it had a limited number of possible values (Leedy & Ormrod, 2013:279). This type of data is often whole numbers that can be measured precisely; such as the amount of customers served (Saunders *et al.*, 2012:475). From the study's point of view it meant that each gym visit or non-visit represented a fixed, whole number, the individual either went to gym, which would count as one, or the individual would not visit the gym which would count as zero.

The next feature that had to be defined is whether the data is categorical or numerical. Numerical data sets are those where the values are measured and counted numerically,

as quantities. It is subsequently more precise, as each data value has a position on a numerical scale (Saunders *et al.*, 2012:475). As the study counted the precise number of times an individual visited or didn't visit the gym, it made use of numerical data.

Lastly, the level of data had to be determined. Data can fall within one of four data categories. These categories determine the complexity of analysis tools at a researcher's disposal. (Black, 2011:10). The data set was classified as ratio data, the most versatile category of all. Reason being that the relative difference between any two data values could be calculated, because it had an absolute zero point (Saunders *et al.*, 2012:475). Zero meant something – the characteristic was either present or not (Black, 2011:9). Whether someone visited the gym more often, or not, could subsequently become the key measure for the study at hand.

As ratio data is the highest category level, any type of analyses could be done. A host of statistical methods were thus available.

5.12.2 Types of statistics: descriptive and inferential

Statistics can be divided into two main categories, namely descriptive and inferential. Descriptive statistics is used when data is organised, summarised and presented in a way that is informative (Lind *et al.*, 2002:6-7). Conclusions can be made from the data obtained (Black, 2011:13). Descriptive statistics is a way to use the data to describe the group that supplied the data. Methods such as frequency distribution, measures of central tendency (mode, median, mean) and dispersion are just some of the methods used within this type of statistical category (Lind *et al.*, 2002:6-7).

Studies can start with descriptive statistics and evolve into inferential statistics as it tries to calculate estimates from a sample to a larger population (Vaughan, 2003:46). Moreover it provides a way to determine whether findings are statistically significant or not for a larger population (Vaughan, 2003:45). Inferential statistics, statistical inferences or inductive statistics (Lind *et al.*, 2002:7) can therefore be described as the follow-up of descriptive statistics, since it takes localised group findings and generalise those to the population-level by indicating its significance.

For this reason, the study made use of both descriptive and inferential statistics. It initially used descriptive techniques to understand what the data looked like, but in order to determine whether the same findings would be found within a larger group, inferential statistics were used.

5.13 CONCLUSION

The chapter started with a discussion of the pragmatic and philosophical view of the study. It highlighted the fact that practical solutions were at the heart of this approach, and that methods of investigation should not be prescriptive. The principle of “*use whatever will deliver the best usable results*” applied.

A multi-method quantitative study approach was subsequently identified, as the research had to be conducted in two phases, both making use of quantitative data collection methods. Phase One had to measure if the health club partner’s infrequent gym visitors made gym related Dynamic Inconsistent decisions, while Phase Two had to determine which communication intervention worked best to change their behaviour.

Phase One made use of descriptive research in the form of an online survey, while Phase Two conducted classic experimental research with the help of text messages. The target population for Phase One was every gym member of the partnering health club who were not being treated for any chronic illnesses. Phase Two however did not need to identify a target population, as the outcome of Phase One became the population. A census could subsequently be conducted in Phase Two.

Both phases made use of simple random sampling. Phase One used the method to identify the sample from the partnering health club population, while Phase Two used it to allocate the infrequent gym visitors, who made gym related Dynamic Inconsistent decisions, into three groups – one control and two experimental groups.

The measurement tool for Phase One was very difficult to define, as no clear exercise related Dynamic Inconsistency measure existed. The measures that did exist either related

to money trade offs in relation to time, or it was a gambling game, of which neither delivered any gym-related results when tested in a pilot study. A new tool had to be developed in the form of the Exercise Consistency Questionnaire. The questionnaire covered all the potential excuses that could make an individual choose not to visit the gym, thus testing for Dynamic Inconsistent decisions.

Phase Two on the other hand made use of gym membership card swipes or non-swipes to determine if any of the two communication interventions had an effect on the infrequent gym member's behaviour who did make Dynamic Inconsistent decisions.

The last section dealt with data analyses. Phase One made use of a coding method in order to identify the infrequent and frequent gym visitors of the health club partner. Phase Two on the other hand made use of descriptive and inferential statistics to analyse the data.

The next chapter will discuss the results delivered from this multi-method quantitative study.

CHAPTER 6: DATA ANALYSIS AND FINDINGS

- Describe the final data obtained for both phases
- Create a visual representation of the data
- Identify if infrequent gym visitors did make Dynamic Inconsistent decisions
- Determine if the Communication Framing interventions changed the behaviour of the infrequent gym visitor who made gym related Dynamic Inconsistent decisions

6.1 INTRODUCTION

As a sequential study was done, Phase One had to be conducted and analysed before Phase two could commence. The first section of this chapter will subsequently discuss the findings of Phase One, which focused on the first research's primary and secondary objectives:

1. Identify whether Dynamic Inconsistency contributed to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month).
 - a. Confirm that only those who visited the gym infrequently made Dynamic Inconsistent decisions.
 - b. Confirm that the frequent gym visitor did not make any Dynamic Inconsistent decisions.

Once Phase One's findings have been discussed, Phase Two's data will be examined to identify whether the second and third primary and secondary research objectives were achieved:

2. Detect if negative goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.
 - a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.

- b. Establish if negative-goal framed messages were more effective in changing behaviour than the positive goal-framed messages.
3. Detect if positive goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.
 - a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.
 - b. Establish if positive-goal framed messages were more effective in changing behaviour than the negative goal-framed messages.

6.2 PHASE ONE: WAS GYM RELATED DYNAMIC INCONSISTENT DECISIONS MADE?

The analyses phase had to start with the interpretation of the data received from the research partner. Data coding was subsequently the first step in the analyses process.

6.2.1 Coding raw data

Each question was re-coded into a data matrix. This made analysis easier due to data being replaced by numerical values (Saunders *et al.*, 2012:482). In this case, a simple coding format was used to replace the 'yes' or 'no' answers. When the respondents answered 'yes' to any of the 27 questions, they received a zero as they showed self-control and persevered through the excuse-temptation. When the respondents answered 'no' however, they received a one as they succumbed to the excuse-temptation.

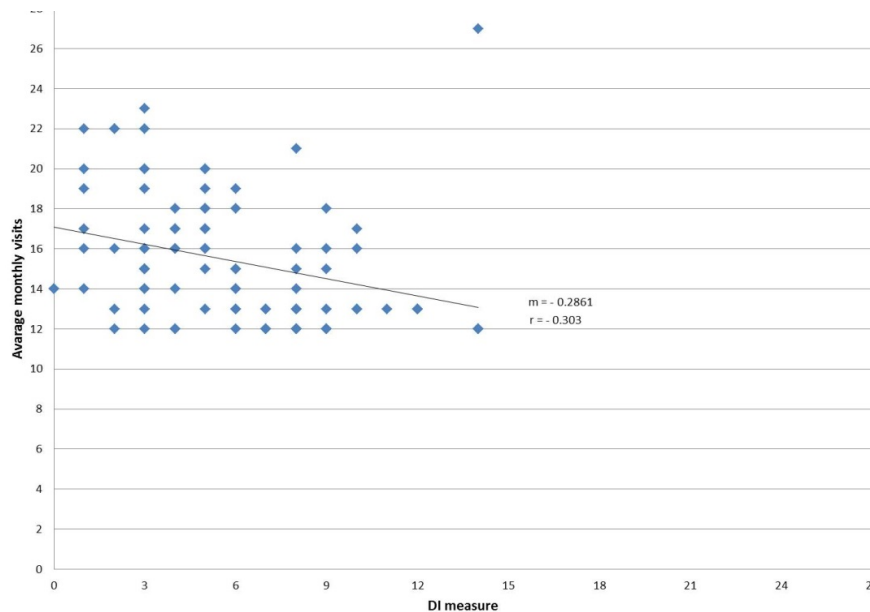
In order to gain richer insight into the data of those who exercised less than 11 times a month at the health club partner's gym, a comparison group was needed. Two groups were subsequently coded: those who exercised less than 11 times a month (infrequent) and those who exercised more than 12 times a month (frequent). Once all the questions were coded for both groups, a total score per respondent was calculated by adding all their codes together. This provided a total score for each respondent. A respondent with a high Dynamic Inconsistency score, namely 27, would indicate low self-control, whilst a low Dynamic Inconsistency score, such as one, would signify high self-control in the face of an

gym related excuse-temptation. The respondents were then ranked, based on their scores, from high to low within their respective groups.

When comparing both the frequent and infrequent groups' scores interesting insights emerged. Almost all respondents had some form of Dynamic Inconsistency, whether they were in the frequent or infrequent group. This highlighted two things. Firstly, the sample size was sufficient. Instead of only 50% of the sample having the Dynamic Inconsistency attribute, close to 100% had some form of it; which led to the second point - it provided further substantiation of Behavioural Economics' bounded willpower principle. It proved, once again, that there is no such thing as the 'Economic Man'. Anyone can succumb to an "*in the moment*" exercise excuse-temptation and make a Dynamic Inconsistent decision, no matter how committed they are. That being said, it did not make the frequent versus the infrequent gym visitor inconsequential. On the contrary, it made it even more important, as it impacted the degree of Dynamic Inconsistency present.

The frequent gym visitors group (Figure 10) had an average Dynamic Inconsistency score of 5.7, a maximum score of 14 and clustered data points between zero and roughly ten. When looking at the graph's trend-line, it becomes clear that it had a negative slope (m), which with the help of statistics, was calculated as -0.2861 . Moreover, the correlation (r) between individuals' monthly gym visits and their Dynamic Inconsistency scores was calculated at -0.303 .

Figure 10: Those who exercise more than 12 times a month's Dynamic Inconsistent scores decrease slowly as the monthly average visits increase.



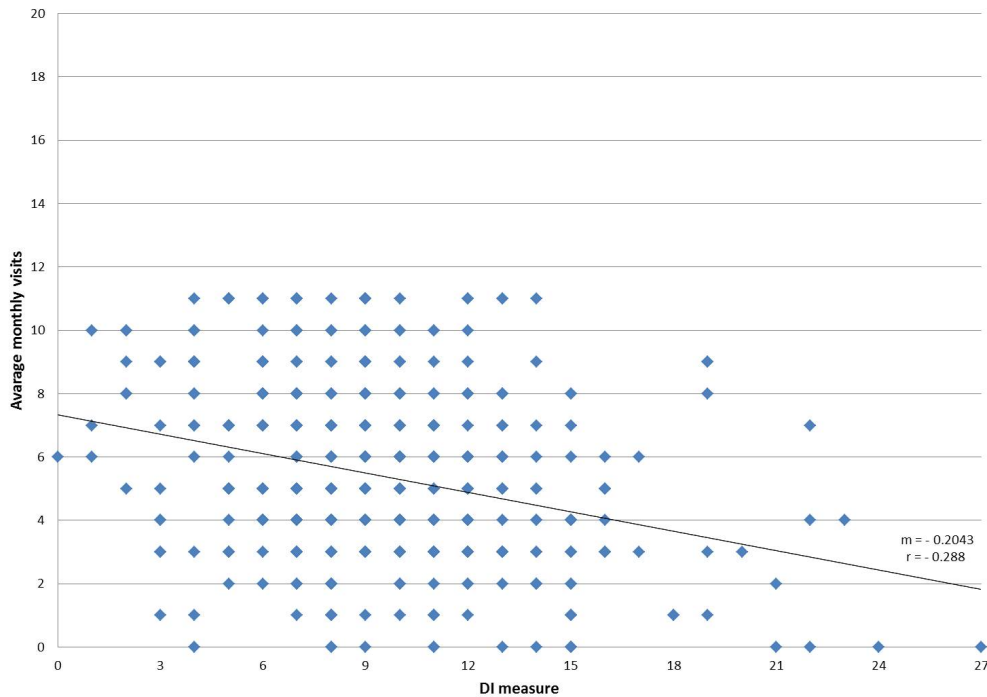
Both calculations led to the same answer. Firstly, the negative slope implied that there was an inverse relationship between the variables – as the one increased, the other decreased (Pierce, 2014). As monthly exercise increased, so Dynamic Inconsistent decisions decreased. A negative correlation was therefore calculated. This suggested that those who exercised more had a lower propensity towards making gym related Dynamic Inconsistent decisions. Keep in mind however that correlations (r) below 0.5 or -0.5 are classified as weak (Lind *et al.*, 2002), making the -0.303 correlation, between average monthly exercise and Dynamic Inconsistency, weak.

Even though the correlation was not as strong as one would have hoped, a slight correlation still existed. The main point then is that there was a slight indication that the health club partner's frequent gym visitors tend to make less Dynamic Inconsistent decisions, as they exercised more. They subsequently made more Dynamic Consistent decisions.

The infrequent gym visitors of the health club partner (Figure 11 below) on the other hand, had slightly different numbers. This group had an average Dynamic Inconsistency of 9.5, a maximum score of 27 and clustered data points around three and fifteen. This is significantly different to that of the frequent gym visitor' results. The trend-line was

marginally different though, with a slope (m) of -0.2043 , whilst having a slightly lower correlation score (r) of -0.288 .

Figure 11: Those who exercise less than 11 times a month’s Dynamic Inconsistent scores decrease significantly as the monthly average visits increase.



The data indicated similar findings to that of the frequent gym visitors group. The data was also negatively skewed and thus also had an inverse relationship. The difference, however, was the degree of the relationship. The infrequent group had lower monthly average exercise rates, which was accompanied by higher Dynamic Inconsistency scores when compared to the frequent gym visitors group.

Thus the infrequent gym visitor went to gym less, as they made more Dynamic Inconsistent decisions. The slightly lower gradient of the trend-line (-0.2043), compared to that of the frequent gym visitors group (-0.2861), subsequently made sense. However with both groups’ correlations being below -0.5 , a weak correlation was found across the board.

There is therefore a slight indication that the health club partner’s infrequent gym visitors tend to make more Dynamic Inconsistent decisions, as they exercised less.

6.2.2 Inferences arising from the data

The following conclusions can then be drawn from these data interpretations. People will fail to follow through on their exercise commitments. Making Dynamic Inconsistent decisions, regardless of the number of times they exercise per month, is a given. However, those who exercise more frequently tend to make less Dynamic Inconsistent decisions, when compared to the infrequent gym visitors' group.

There is subsequently a slight correlation between exercise frequency and making Dynamic Inconsistent decisions. The more one exercise, the stronger the resolve becomes to continue. Yes there are lapses in judgment along the way, but not to the extent of those who exercised less often. It is for exactly this reason why an intervention targeted specifically at infrequent gym visitors is so important.

If this group of 446 respondents could be influenced to become more frequent gym visitors, like the 93 respondents, their Dynamic Inconsistency score should become lower, as in the case of the frequent exercise group. This will result in more gym sessions and ultimately healthier individuals. It is therefore not about curing Dynamic Inconsistent gym decisions in the health club partner's infrequent gym visitors group, but rather about assisting them in making it happen less often.

6.2.3 Answering the first objectives

The answer to the first research question posed by this study is therefore as follows:

1. There was a slight indication that Dynamic Inconsistency did indeed contribute to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month).
 - a. There was a slight indication that people who visited the gym infrequently made Dynamic Inconsistent decisions. However they were not alone as the original premise implied.

- b. There was a slight indication that those who visited the gym frequently also made Dynamic Inconsistent decisions, which was contrary to the original expectation.

6.3 PHASE TWO: DID ANY OF THE COMMUNICATION INTERVENTIONS CHANGE BEHAVIOUR?

With the data collected from the Positive, Negative and Control Groups, it had to be analysed in order to determine whether any of the interventions had an impact on the frequency of the infrequent population's gym behaviour.

A total of 445 participants were observed: The Positive and Negative Groups each had 148, while the Control Group had 149. Various studies were consulted for guidance on using the correct statistical methods in the analysis of these three groups (Gamliel & Peer, 2010; Latimer *et al.* 2008, Levin *et al.*, 1998; van 't Riet *et al.*, 2010). The results were inconclusive. Every study used different methods in order to interpret their respective results. The study subsequently did the same and made use of various statistical methods.

6.3.1 The detail of the data

Even though the groups had sufficient numbers of individuals, new information came to light, which impacted the groups' sizes. A portion of each group's participants had to be excluded from the study because of the following.

Firstly, there had to be a base period for each respondent in order to have a comparative period. To determine whether someone exercised more in 2014 can only be done if an exact time period of the previous year is available for comparison. The Control Group would provide a trend indication for a particular time period, but not whether it was normal for a person to exercise a certain amount during the same time period. Each respondent subsequently had to have an exact time period of the previous year in order to qualify. Anyone who started a contract after May 2013 or cancelled before July 2014 was consequently disqualified.

The second reason was due to the 'opt out option' in every sms. Participants had the option to terminate their participation at any time during the intervention period. Hence the reason why anyone who indicated, at any stage, that they did not want to receive further text messages were excluded.

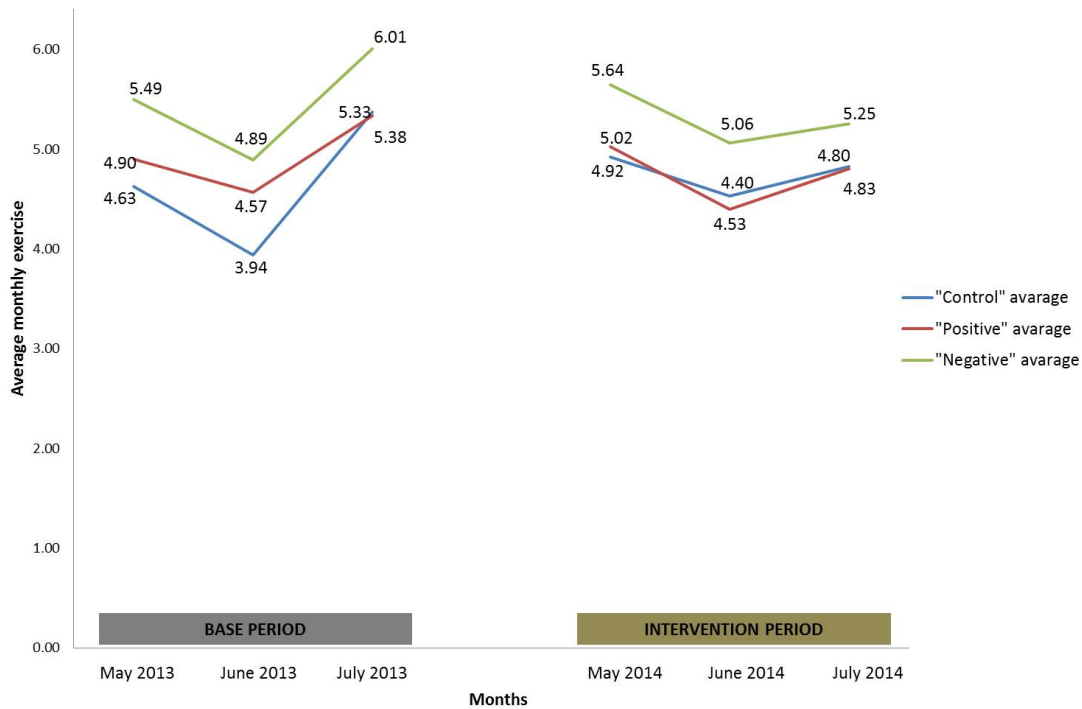
Invalid cellphone numbers was the last reason why some people did not receive the communication intervention. Some respondents gave incorrect numbers to the health club partner, which only came to the fore once the messages were being sent.

The final count per group was therefore as follows: The Positive Group had 82 individuals, the Negative 95 and the Control Group 104. With the numbers finalised, the analysis could begin. Keep in mind that the analysis started with a descriptive analysis and progressed to inferential statistics when needed.

6.3.2 Visualising the data (descriptive)

When data points are summarised in a graph, its pattern or trend can immediately be seen due to its visual representation (Vaughan, 2003:15). Saunders *et al.* (2012:525) describe this same principle by stating that drawing a line-graph in order to visualise the data is one of the first steps to take with data. Figure 12 below provides an initial look at the Control, Positive and Negative Groups' monthly averages for the 2013 base and 2014 intervention periods.

Figure 12: Visual representation of the average monthly exercise rates across the 2013 base and 2014 intervention periods



At first glance both periods look similar. A closer look reveals that the Negative Group (green line) is almost always at the top, whereas the Control Group (blue line) is at the bottom during 2013, yet mostly in between the Positive and Negative Group in 2014. The Positive Group (red line) is in-between during 2013; yet dip below the Control Group in June and July, creating the impression that the interventions were unsuccessful in impacting exercise behaviour.

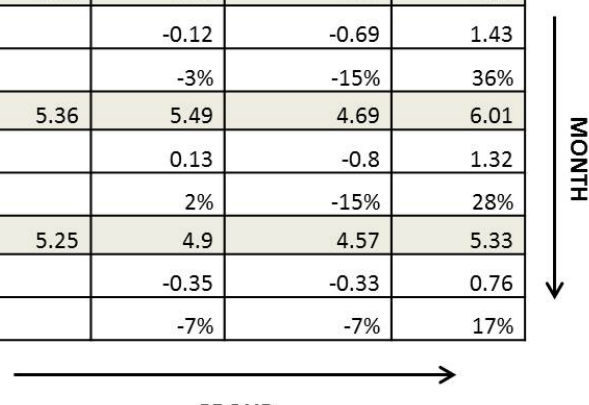
To presume that the Negative Group outperformed all the rest and had an impact on gym behaviour just because it was above the rest is simply incorrect, as it followed a similar 2013 pattern. It subsequently seems as if neither communication intervention had an impact. However a deeper understanding of the data at hand had to be gained before this conclusion could be reached.

6.3.3 Comparing the 2013 Control and communication intervention groups (descriptive)

The aim was to compare the 2013 Control Group with the 2013 communication intervention groups, in order to identify if there was a specific trend during the corresponding time periods. Table 3 provides an overview of 2013's May, June and July average data across the three different groups.

Table 3: Comparing the three 2013 groups in order to identify a trend over the months of May, June and July

	April	May	June	July
Control 13	4.75	4.63	3.94	5.37
Difference		-0.12	-0.69	1.43
% difference		-3%	-15%	36%
Negative 13	5.36	5.49	4.69	6.01
Difference		0.13	-0.8	1.32
% difference		2%	-15%	28%
Positive 13	5.25	4.9	4.57	5.33
Difference		-0.35	-0.33	0.76
% difference		-7%	-7%	17%



In 2013 the Negative Group did not show a similar pattern to the Control Group with May being positive, while the Control Group was negative. June and July however did follow the same pattern with both the Control Group and Negative Group being negative in June and positive in July. When looking at the actual figures the Negative Group outperformed the Control Group by increasing 2% compared to a 3% decline. Both groups were stable in June with -15%, while the Control Group secured July with 36% compared to the Negative's 28%.

The Positive Group tell a slightly different story as it declined 7% instead of the Control's 3%. It declined 7% again in June, however the Control Group declined by 15%. The Positive Group also increased in July, but only 17% as opposed to the Control's 36%.


The conclusion was therefore that no clear trend emerged during the 2013 time frame.

6.3.4 Comparing the 2014 intervention groups to their respective 2013 base lines groups (descriptive)


The 2014 intervention groups had to be compared to their respective 2013 base lines, in order to identify whether behaviour change took place (see Table 4). The groups had to outperform their base periods for two consecutive months in order to indicate any kind of success.

Table 4: Comparing the 2014 intervention groups to their respective 2013 base line periods in order to identify effectiveness over the months of May, June and July.

	April	May	June	July
Control 13	4.75	4.63	3.94	5.37
Difference		-0.12	-0.69	1.43
% difference		-3%	-15%	36%
Negative 13	5.36	5.49	4.69	6.01
Difference		0.13	-0.8	1.32
% difference		2%	-15%	28%
Positive 13	5.25	4.9	4.57	5.33
Difference		-0.35	-0.33	0.76
% difference		-7%	-7%	17%


 GROUP

	April	May	June	July
Control 14	4.65	4.92	4.53	4.83
Difference		0.27	-0.39	0.3
% difference		6%	-8%	7%
Negative 14	5.38	5.64	5.06	5.25
Difference		0.26	-0.58	0.19
% difference		5%	-10%	4%
Positive 14	4.68	5.02	4.4	4.8
Difference		0.34	-0.62	0.4
% difference		7%	-12%	9%


 GROUP

The 2014 Control Group were more stable with less extreme numbers when comparing 2013 with 2014. May 2014 increased by 6% while May 2013 declined 3%. June 2013 decreased 15% while 2014 only 8%. July on the other hand saw smaller growth in 2014 at 7%, compared to its 2013 counterpart, which grew by 36%. The year 2014 was subsequently much more stable, showing fewer declines and more growth spurts

compared to 2013. The assumption was thus that all intervention groups would follow the same more stable approach.

This was proven to be correct with the Negative Group (see Table 4 above). May grew 5% in May 2014 compared to 2% in 2013. Even though June 2014 still declined in line with the 2013 pattern, it did so on a smaller scale at only 10% compared to 2013's 15%. However the 4% growth in July 2014 was in stark contrast to July 2013's 28%. Nevertheless, the monthly growth or decline pattern was still the same as its 2013 counterpart: positive, decline, positive.

The Positive Group on the other hand was a bit of a mixed bag (see Table 4 above). It was only half consistent in the monthly pattern. May 2014 differed from May 2013, as it was positive and not negative. The rest of the comparable months coincided with each other from a growth-decline point of view. June was negative and July positive. When looking at the actual figures it showed that May 2014 outperformed May 2013 by increasing 7% compared to the 7% decrease of 2013. Yet June 2013 only declined 7%, while June 2014 declined by 12%. July was a growth spurt for both years, but 2013 grew 17% while 2014 increased by 9%.

All groups followed a similar trend in 2014 compared to their 2013 counterparts: more growth spurts and fewer declines were observed in 2014 compared to 2013's base period. Yet chaos still prevailed. No clear winners came to the fore. The intervention groups showed no consistency in terms of a growth or decline percentage and no two consecutive outperforming months were observed.


All signs were pointing to the communication interventions being a failure. However, before this conclusion could be reached, the intervention groups had to be compared to the 2014's Control Group.


6.3.5 Comparing the 2014 Control Group with the 2014 communication intervention groups (descriptive)

A comparison between the 2014 Control Group and the 2014 communication intervention groups, were conducted in order to detect if any were effective. Two consecutive outperforming months for the communication intervention groups compared to the control, would again indicate success. When comparing the Positive and Negative Groups with the Control Group individually, the same fragmented pattern emerged. Both groups had a similar growth-decline pattern as the Control Group with May being positive, June negative and July positive (see Table 5).

Table 5: Comparing the 2014 communication intervention groups to the 2014 Control Group in order to identify any kind of effectiveness over the months of May, June and July.

	April	May	June	July
Control 14	4.65	4.92	4.53	4.83
Difference		0.27	-0.39	0.3
% difference		6%	-8%	7%
Negative 14	5.38	5.64	5.06	5.25
Difference		0.26	-0.58	0.19
% difference		5%	-10%	4%
Positive 14	4.68	5.02	4.4	4.8
Difference		0.34	-0.62	0.4
% difference		7%	-12%	9%





A chaotic trend was observed again, even when taking a more granular look at the data (Table 5). In May the Negative Group outperformed the Control Group slightly with a 5% compared to 6%. In June the Control Group acquired the highest position with a smaller decline of 8% as opposed to the Negative's 10%. July was again conceded to the Control Group who increased 7% compared to the Negative's 4%.

The Positive Group painted a slightly different picture (Table 5). In May the Positive Group grew by 7% compared to the Control's 6%. June had to be yielded to the Control Group as the Positive Group declined 12% as appose to the Control's 8%. July however was again claimed by the Positive Group who increased 9% compared to the Control's 7%.

The main conclusion is thus that there was no real pattern that indicated effectiveness when comparing the 2014 Control Group with the 2014 Positive and Negative Groups. Consequently none of the intervention groups had two consecutive months where they outperformed the 2014 Control Group.

6.3.6 In summary

When looking at the results holistically, a picture of chaos emerges. Both groups followed a similar growth-decline trend as the Control, but that's where the similarities ended. Most of the Negative Group's results or percentages were below those of the 2014 Control Group; however it followed a similar pattern as that of the Control. Two months up, one month down.

The Positive Group results, on the other hand, exceeded the Control Group in May and July with only June being below. It also bucked the Control Group trend of two months up, one month down by being one month up, two months down. Consequently neither the Negative nor the Positive Group had a clear increasing or decreasing trend across the three different months. In order to confirm these results an ANOVA test was conducted.

6.3.7 Testing for change: ANOVA (inferential)

The Analysis of Variance test (ANOVA for short) statistically compares the means of at least three groups with each other simultaneously, in order to see if they are significantly different (Leedy & Ormrod, 2013:301; Lind *et al.*, 2002:414). The mean indicates the average of the data set and is one of the measures of Central Tendency, which provides a general impression of the data (Leedy & Ormrod, 2013:286; Saunders *et al.*, 2012:504). Moreover, it assesses the likelihood of any difference between these groups occurring by chance (Saunders *et al.*, 2012:665).

The ANOVA test uses a measure irregularity called variance, to inspect the differences between the means (Vaughan, 2003:125-126). It does this by analysing "the spread of the data values within and between groups of data by comparing their means. The F ratio, or F statistic, represents the differences. If the likelihood of any difference between groups

occurring by chance alone is low, this will be represented by a large F ratio, with a probability of less than 0.05. This is termed “*statistically significant*” (Saunders *et al.*, 2012:665).

The goal of the ANOVA test, within the study’s context, was thus to see if the mean differences within the Positive, Negative and Control Groups were the same when compared. It also looked at the average mean difference within each of the groups and compared that to the mean amongst different groups. Tables 6, 7 and 8 depict the ANOVA tests for May, June and July.

Table 6: Analysing the change variance within and between May’s Positive, Negative and Control Groups.

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	36.78829	2	18.39414	0.728583	0.483172	3.016175
Within Groups	11133.69	441	25.24646			
Total	11170.48	443				

Table 7: Analysing the change variance within and between June’s Positive, Negative and Control Groups.

ANOVA						
<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	10.70721	2	5.353604	0.207274	0.812876	3.016175
Within Groups	11390.45	441	25.82869			
Total	11401.16	443				

Table 8: Analysing the change variance within and between July’s Positive, Negative and Control Groups.

ANOVA

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	27.57207	2	13.78604	0.460803	0.63108	3.016175
Within Groups	13193.59	441	29.91743			
Total	13221.16	443				

The three months' ANOVA tests (Tables 6, 7 and 8 above) revealed that all the F Statistics (F) were small, while the probability (P -value) was more than the recommended 0.05. This implies that any difference between groups was more likely by chance rather than because of the communication interventions. In other words the communication interventions did not have a statistical significant impact. The changes in the groups were subsequently coincidental as opposed to being related to the intervention.

Based on the data at hand, it seemed as if the text messages had no real effect. However, an argument against using averages as a measure could be made. Lind, *et al.* (2002:14) bring this idea to life with the following example: *"If a real estate developer tells a client that the average home in a particular subdivision sold for \$150,000 we assume that \$150,000 is a representative selling price for all the homes. But suppose there are only 5 homes in the subdivision and they sold for \$50,000, \$50,000, \$60,000 \$90,000 and \$500,000. We can correctly claim that the average selling price is \$150,000 but does \$150,000 really seem like a "typical "selling price?"*

It was therefore possible that the average numbers used in the above analyses were *"typical"* by nature, resulting in the true effectiveness of the interventions being hidden. In order to confirm this suspicion, a more granular analysis had to be done on each group's individual real data.

6.3.8 Analysing each group's individual data (descriptive)

The first step in taking a closer look at the data was to identify those who exercised more in 2014 compared to 2013. This could be done with the help of a scatter plot. A scatter plot is a two-dimensional graph created by plotting points between two numerical variables

(Black, 2011:38). In this case, the actual exercise behavioural per individual of May to July 2013 and May to July 2014 of the different groups represented the plotted points on each graph. This type of graph is particularly fitting when trying to explore a relationship between two variables (Saunders *et al.*, 2012:502). Plotting a graph to illustrate a relationship between two variables could indicate, for instance, whether there was an increase or decrease in the Positive Group's May 2014 values compared to May 2013 values.

The strength of a relationship is indicated by the closeness of the data points on an imaginary straight line (Saunders *et al.*, 2012:502). This means that, if a data point is below the imaginary line it has a stronger relationship with the X-axis (in this case 2013). Any point above the line will have a stronger relationship with the Y-axis (in this case 2014).

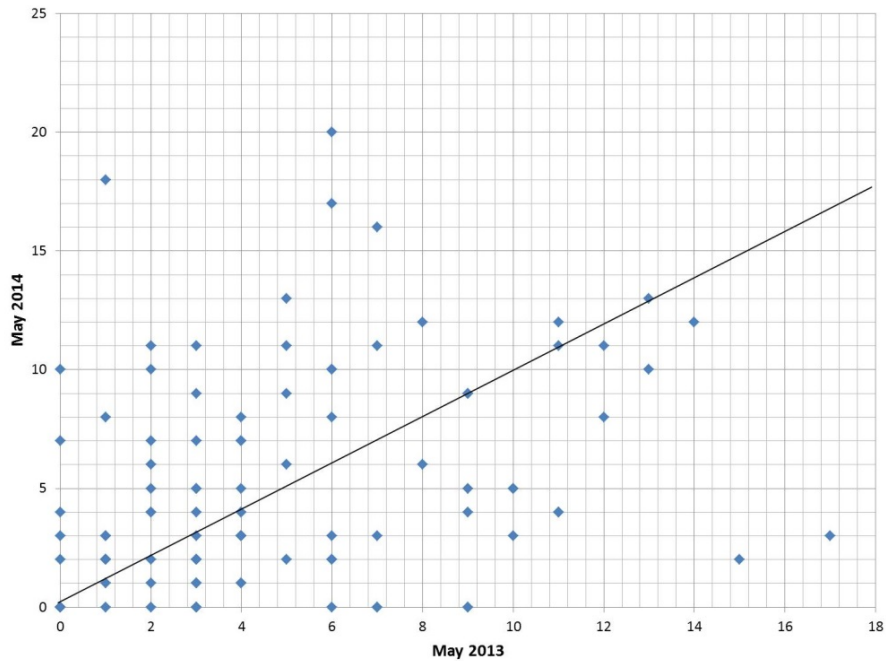
Practically speaking, this meant that if the data points were above the line people were exercising more in 2014 compared to 2013, because the data points were closer to the Y-axis. Similarly data points below the line would represent those who exercised more in 2013 compared to 2014, because the data points were closer to the X-axis. Data points on the imaginary line would indicate people who stuck to the same exercise routine in 2014 as they did in 2013.

A black line has been drawn on all scatter graphs in order to ensure accuracy when identifying the values. Also, keep in mind that respondents could have the same plotted point on the graph. One point could represent 6 individuals who all went 0 times in 2013 but 12 times in 2014. The plot would then be counted 6 times as opposed to only once.

6.3.8.1 May's scatter graphs

When looking at the Control's data for May (Figure 13) it becomes clear that there is a relatively even split between the two years. Out of the 104 individuals 40% exercised more in 2013, while 41% exercised more in 2014. The rest of the individuals, 18%, exercised just as much in 2014 as in 2013.

Figure 13: Comparing the Control Group’s May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014

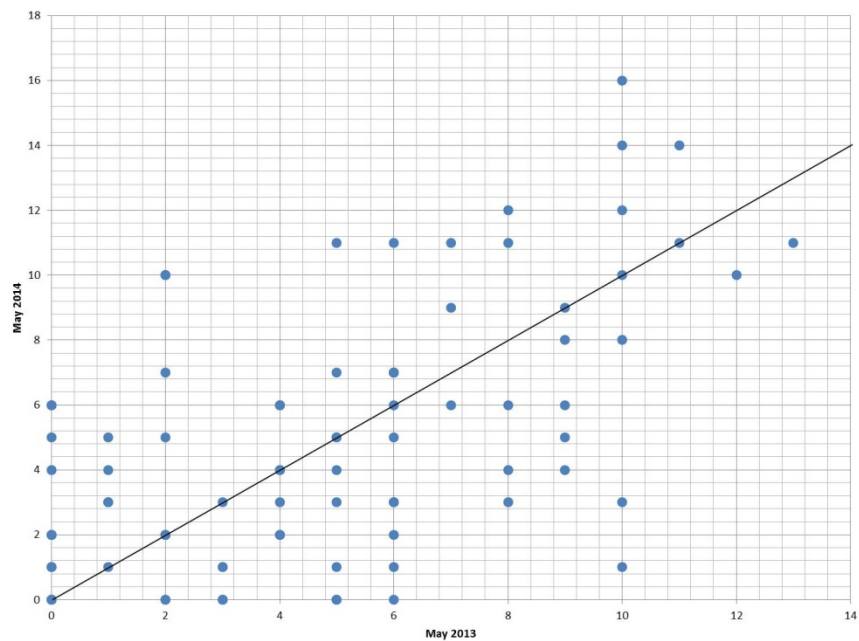


Control Group May	N = 104	C
Below the BLACK line (exercise more in 2013 than 2014)	42	40%
On the BLACK line (exercise the same in 2013 as 2014)	19	18%
Above the BLACK line (exercise more in 2014 than 2013)	43	41%

The results were slightly different for the Positive Group. Figure 14 below shows how 39% of the 82 individuals exercised more in 2013, whilst 41% exercised more in 2014. The percentage of people in this group who was skewed towards 2014, were the same as their counterparts in the Control Group, but those who were skewed toward 2013 in the Positive Group were a little less at 39%. This 1% difference was absorbed into the 20% of people

who exercised the same number of times in 2013 as in 2014, which is effectively 2% higher than the Control's 18%.

Figure 14: Comparing the Positive Group's May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014

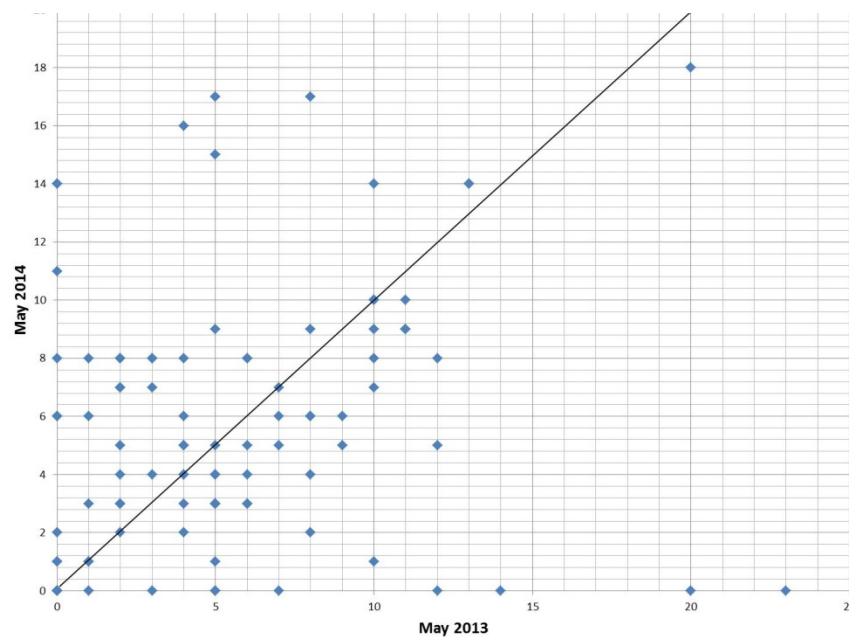


Positive Group May	N = 82	P	C
Below the BLACK line (exercise more in 2013 than 2014)	32	39%	40%
On the BLACK line (exercise the same in 2013 as 2014)	16	20%	18%
Above the BLACK line (exercise more in 2014 than 2013)	34	41%	41%

The argument can subsequently be made that the intervention did have an effect, as it assisted a higher percentage of individuals in maintaining the same exercise regime as 2013. This growth came from those who exercised more in 2013 than in 2014. This is a good thing in principle as individuals continued the same routine as the previous year. However it does not necessarily imply that people were active, as it could also have kept someone who was inactive in May 2013 consistent in 2014.

The Negative Group, on the other hand, paints a different picture (see figure 15). A total of 43% of the 95 individuals exercised more in 2013. This is the highest number of all the groups 3% more than that of the Control. The consistent group, however, was slightly lower at 17%, compared to the Control’s 18%. Those who were more active in 2014 were also slightly lower at 40%, compared to the Control’s 41%.

Figure 15: Comparing the Negative Group’s May 2013 and May 2014 data points in order to establish how many people had skewed towards 2013 or 2014



Negative Group May	N = 95	N	C
Below the BLACK line (exercise more in 2013 than 2014)	41	43%	40%
On the BLACK line (exercise the same in 2013 as 2014)	16	17%	18%
Above the BLACK line (exercise more in 2014 than 2013)	38	40%	41%

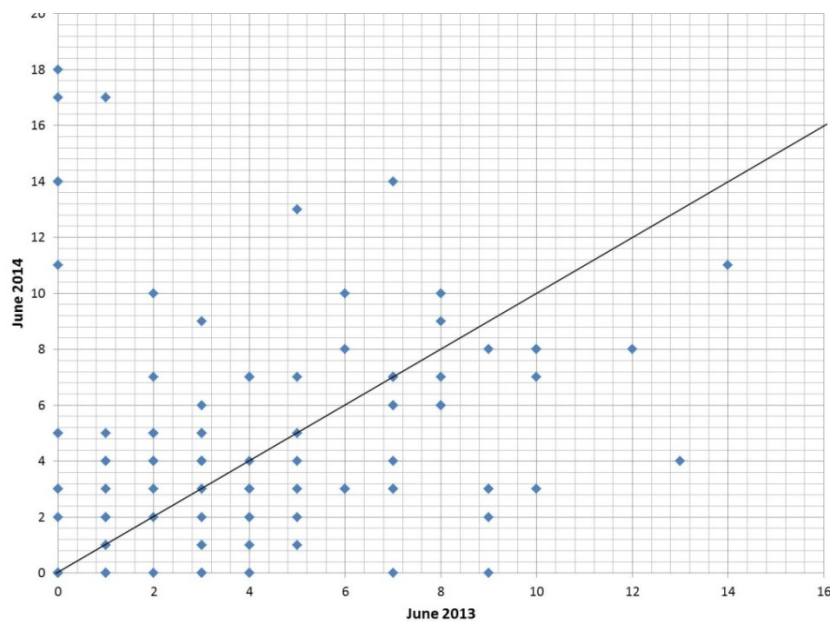
It can therefore be concluded that the Positive Group’s intervention outperformed the other groups during May. When combining the ‘stable-exercise’ and ‘exercising-more-in-2014’ sections in the three group specific tables the argument becomes even stronger, as the Positive Group comprised 61%, the Control Group 59% and the Negative 57%. The Positive Group yielded this result by taking some of the share of those individuals who exercised more in 2013 and adding it to the consistent-individuals group. The Negative

Group, on the other hand, took share from both the constant-exercise group and those who exercised more in 2014, and added it to the group who exercised more in 2013. The negative communication intervention subsequently resulted in less active gym members in 2014. Yet neither group delivered an increase in the number of people who exercised more in 2014.

6.3.8.2 June's scatter graphs

During June 44% out of the 104 Control Group individuals exercised more in 2013, while only 39% exercised more in 2014 (see graph 16). Those who exercised just as much in 2014 than 2013 were 16%. All measures dropped compared to May.

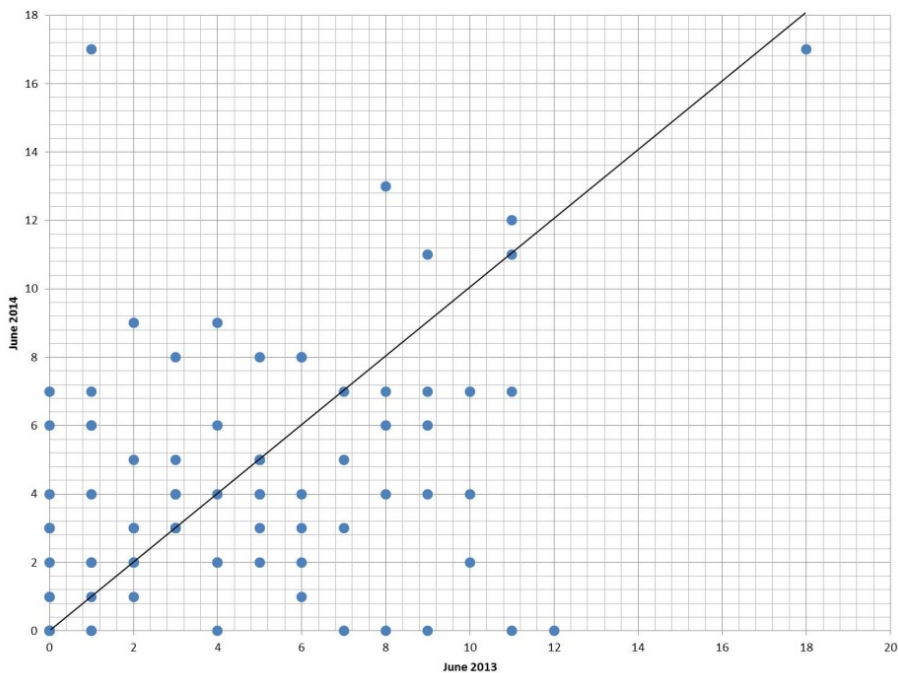
Figure 16: Comparing the Control Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014



Control Group June		N = 104	
Below the BLACK line			
(exercise more in 2013 than 2014)	46		44%
On the BLACK line			
(exercise the same in 2013 than 2014)	17		16%
Above the BLACK line			
(exercise more in 2014 than 2013)	41		39%

The Positive Group showed more movement in June compared to May (see graph 17). Out of the 82 individuals 39% exercised more in 2013. This is lower than the Control's 44% and consistent with the Positive Group's May percentage. This consistency is a good thing for the positive communication intervention, as no additional individuals were added to the "exercise more in 2013 than 2014" group. The Control on the other hand added 4% to the corresponding group.

Figure 17: Comparing the Positive Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014



Positive Group June	N = 82	P	C
Below the BLACK line (exercise more in 2013 than 2014)	31	39%	44%
On the BLACK line (exercise the same in 2013 as 2014)	19	23%	16%
Above the BLACK line (exercise more in 2014 than 2013)	32	39%	39%

However the Positive Group did lose 3% of individuals who exercised more in 2014 compared to the previous month. June dropped to 39%. It did so in line with the Control Group who also moved to 39%. The Positive Group's 3% decline was absorbed into those who exercised the same amount in 2013 and 2014, resulting in a growth of 23% compared

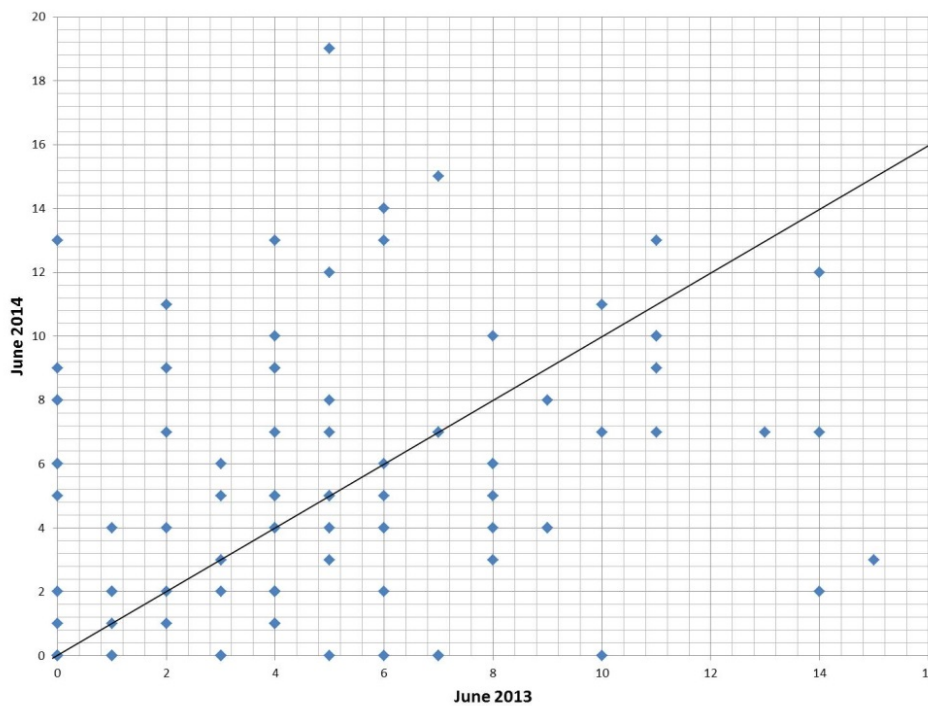
to the previous month's 20%. This is in contrast to the Control Group who absorbed it into those who exercise more in 2013, growing this group from 40% in May to 44% in June.

It must also be noted that the Control Group decreased both those who exercised more in 2014, as well as those who stuck to their routine when comparing to the month before. The Positive Group on the other hand did the opposite. Those who exercised more in 2013 decreased while the stable group increased.

The Positive Group subsequently performed better in June than the Control Group with the same May-trend being observed in June. Those who exercised more in 2013 for the Positive Group stayed stable month on month, while the Control Group increased. This meant that the Positive Group had fewer people who exercised more in 2013 compared to the Control. The Positive Group also had more people sticking to their exercise plan of the year before compared to the Control. However neither the Positive nor the Control Group increased those who exercised more in 2014.

The Negative Group showed some interesting results (see Figure 18 below).

Figure 18: Comparing the Negative Group's June 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014



Negative Group June	N = 95	N	C
Below the BLACK line (exercise more in 2013 than 2014)	42	44%	44%
On the BLACK line (exercise the same in 2013 as 2014)	16	17%	16%
Above the BLACK line (exercise more in 2014 than 2013)	37	39%	39%

Out of the 95 individuals 44% exercised more in 2013 which is 1% higher than the previous month, yet in line with the Control Group who increased by 4% to end at 44%. This means that the Negative Group might have increased those who exercised more in 2013, but it did so at a slower rate compared to the Control.

Its stable group stayed consistent to the month before at 17%. Yet it was 1% higher than the Control Group who fell from 18% the previous month to 16%. The Negative Group subsequently stayed stable while the Control Group decreased by 2%.

The group who exercised more in 2014 decreased slightly with 1% ending at 39%. All groups were thus at 39%. It declined again at a slower rate from the month before compared to the Control Group who declined by 2%.

This means that the intervention did have an effect. It helped to slow down the wrong declines e.g. decreasing those who exercised more in 2014, or increases e.g. increasing those who exercised more in 2013. It curbed the decline in the group who exercised more in 2014 to such an extent that it fell less than the Control. It increased those who exercised more in 2013 at a slower rate compared to the Control's significant increase.

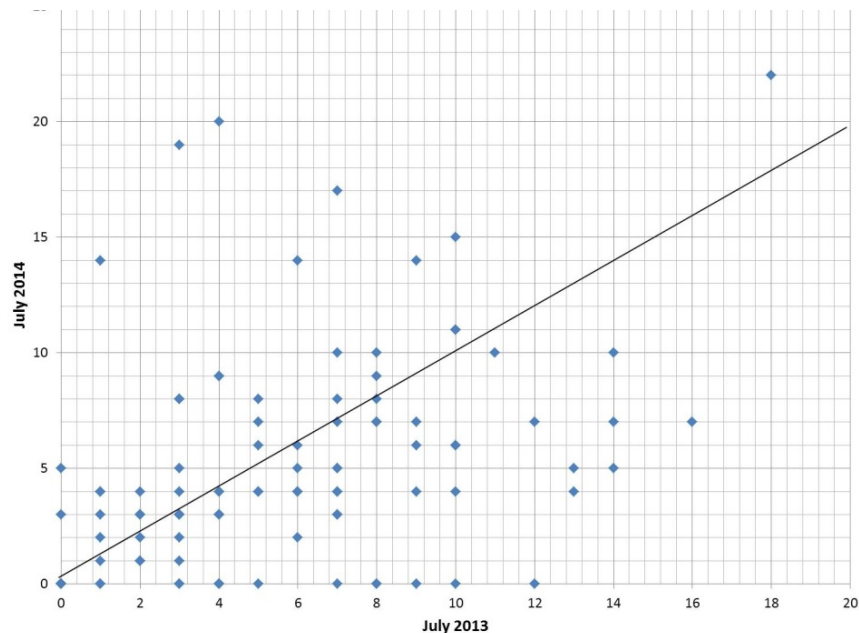
It can therefore be concluded that both interventions had an effect during the month of June. To put it in perspective: when combining the stable and exercising more in 2014 groups, the Positive Group had 62%, the Negative 56% and the Control Group 55%. The Positive Group (62%) though showed bigger impact than that of the Negative Group (56%), as it accelerated the move of people out of the "exercising more than 2013 group" and into the stable group. Those who exercised more in 2013 were subsequently less. The Negative Group on the other hand helped to put the brakes on where necessary. It stunted

growth in the “exercising more in 2013” group and curtailed decline in the “exercising more in 2014” group. None of the groups however increased the amount of people who exercised more in 2014.

6.3.8.3 July scatter plots

The Control Group saw an increase in those who exercised more in 2013, growing from 44% to 48% (see Figure 19). Those who exercised more in 2014 decreased even further from 39% to 31%, while the constant group rose from 16% to 21%. This meant that those who fell out of ‘exercising more in 2014’ either went back to their 2013 routine or visited the gym more in 2013.

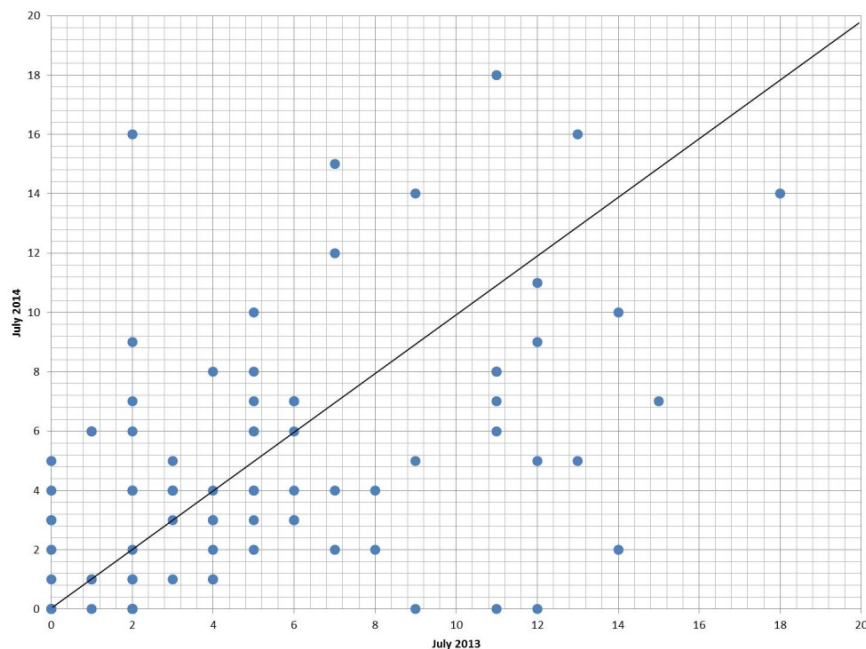
Figure 19: Comparing the Control Group’s July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014



Control Group July	N = 104	C
Below the BLACK line (exercise more in 2013 than 2014)	50	48%
On the BLACK line (exercise the same in 2013 as 2014)	22	21%
Above the BLACK line (exercise more in 2014 than 2013)	32	31%

A total of 51% of the Positive Group's 82 individuals fell into the group that exercised more in 2013 (see Figure 20 below). This is higher than the Control's 48% and significantly higher than the previous month's 39%. Those who exercised more in 2014 however illuminated some interesting insights. The Positive Group was at 38% while the Control Group was at 31% indicating a 7% difference. Granted the Positive Group's month on month comparison showed a 1% drop, but the Control's was even worse at 7%. This left the impression that the positive intervention helped to curb the fall.

Figure 20: Comparing the Positive Group's July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014

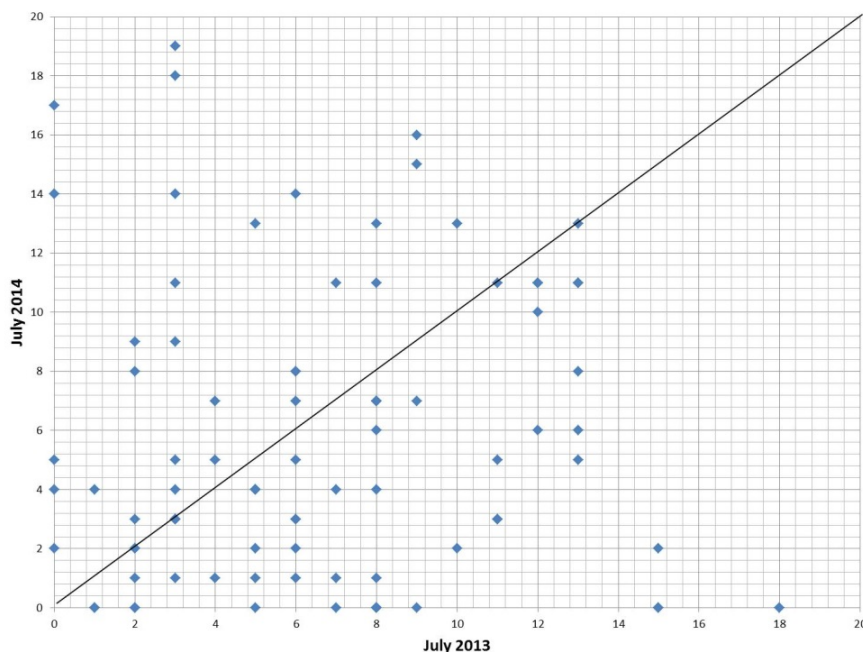


Positive Group July	N = 82	P	C
Below the BLACK line (exercise more in 2013 than 2014)	42	51%	48%
On the BLACK line (exercise the same in 2013 as 2014)	9	11%	21%
Above the BLACK line (exercise more in 2014 than 2013)	31	38%	31%

Nevertheless, when combining the stable and exercising more in 2014 table sections it becomes clear that the Control's shifts were the better option. A total of 52% fell within these two groups, while the Positive had only 49%. The positive intervention subsequently had an effect, but less beneficial than the Control.

The Negative Group for July (Figure 21) showed the exact same results as the Positive Group just on a smaller scale.

Figure 21: Comparing the Negative Group's July 2013 and 2014 data points in order to establish how many people had a skew towards 2013 and 2014



Negative Group July	N = 95	N	C
Below the BLACK line (exercise more in 2013 than 2014)	50	53%	48%
On the BLACK line (exercise the same in 2013 as 2014)	14	15%	21%
Above the BLACK line (exercise more in 2014 than 2013)	31	33%	31%

It also had a massive increase in those who exercised more in 2013. It went from 44% to 53%, while the Control Group only increased to 48%. Yet those who exercised more in 2014 did not decline month on month by as much as the Control. It declined from 39% to 33% versus the Control Group, which declined from 39% to 31%. It also got its growth from those who had a stable routine with a decline of 15% as appose to 17%.

When combining the stable and exercising more in 2014 table sections for both the Negative Group and the Control Group it becomes clear yet again that the Control's shifts were the better option. A total of 52% fell within these two groups, while the Negative had only 48%; 1% lower than the Positive Group's 49%. The negative intervention also had an effect, but less beneficial than the Control.

The Control Group showed the best results across all groups, as it still had more people either exercising the same as in 2013 or exercise more in 2014 than the Positive or Negative Group.

6.3.9 Scatter plot findings in summary

Both interventions had an effect; however, there seems to be an indication that they performed different functions. The positive intervention accelerated growth, or necessary decline. For the months of May and June, an increase of those who had a stable exercise routine was observed, whilst reflecting a comparatively lower percentage of those who exercised more in 2013. In both instances the Control Group was outperformed.

The negative intervention, on the other hand, curbed the declines or necessary increases. The June Negative Group saw less extreme declines in those who exercised more in 2014

and a lower rate of increase in those who exercise more in 2013. The Control Group was outperformed in both instances.

July was a bit of an anomaly as the classification of a “better performer” becomes less clear-cut. If it were determined based on how many people exercised more in 2014 the Positive Group would have been the obvious choice as it had 38%, whilst the Negative had 33%. The Control Group trailed at 31%. If “better performance” were more concerned with the holistic picture, therefore, who exercised more in 2014 or had stable 2013/2014-exercise behaviour, the Control Group would be the better choice as it declined at a slower rate than the other two groups.

The point though, is that both interventions had a small effect when looking at the specific data points. It may not have grown people’s gym attendance, but it accelerated growth in some stable-exercise routines in comparison to those who exercised more in 2013.

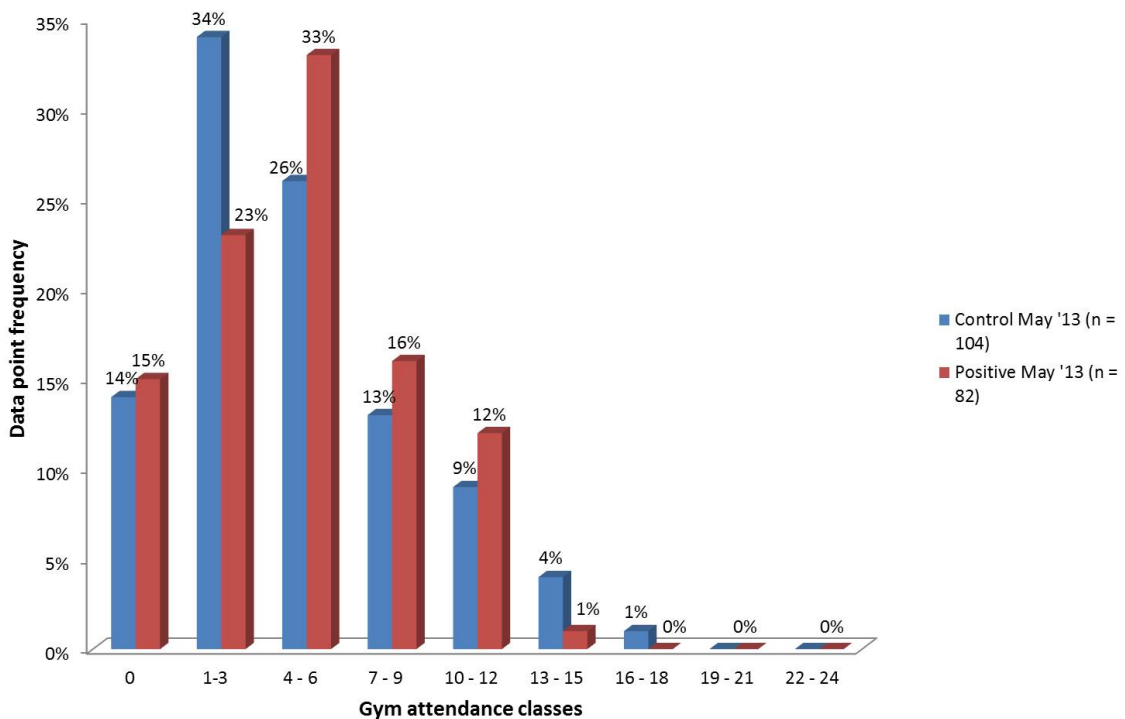
As there is no clear trend in the sense that certain behaviours were built over the three consecutive months, it can still be argued that it was just a coincidence. Moreover, the fact that the stable exercise group either grew or stayed stable, potentially due to the intervention, could be good or bad. It could either keep an active gym member active at the same rate as 2013 OR it could keep the in inactive, inactive. If it did the latter, the interventions would be null and void. In order to answer these concerns, an even more detailed approach had to be followed by looking at the data’s frequency distribution.

6.3.10 Frequency distribution: clustering the data (descriptive)

Frequency distribution assists with organising a data set in a way that makes it easier to understand. It usually starts with organising the data into specific groups or classes. All the data points are then counted within each of the classes in order to determine the frequency, and subsequently, the importance of that class (Vaughan, 2003:21). This assists in identifying the cluster point of the data values, as well as the largest and smallest values (Lind *et al.*, 2002:22).

Figure 22 provides an example of the specific classes identified, as well as the frequency count for each of these classes, which have been converted into percentages, for ease of comparison. The graph particularly focuses on the Positive and Control Group during the month of May 2013. The Control Group was used in comparison with the intervention group, as it indicates whether a data shift occurred naturally or not.

Figure 22: Comparing the frequency distribution of the May 2013 Positive Group to the frequency distribution of the May 2013 Control Group



As all of the graphs indicated the same phenomenon, only one was included as an example. The rest can be seen in Appendix D. The analysis method only looked at three

key elements (clustering, smallest and largest), which resulted in the impact of the interventions being lost, as was the case with the averages graphs in the beginning. Every graph had similar findings: the smallest point was always zero; the cluster point was mostly within the ‘1 to 3 visits per month’ class or the ‘4 to 6 visits per month’ class, and the largest point with a recorded value was mostly within the ‘16 to 18 visits a month’ class.

This high level information is great for understanding what each month’s data looked like, but did not really help in answering the two questions posed at the end of 6.3.9: is there proof to negate that the results were just coincidences and did the interventions help to make people more active? A different approach subsequently had to be taken.

6.3.11 Growth or decline shifts within gym attendance classes (descriptive)

In order to generate a bar graph, as in Figure 22, a table had to be generated which took the gym attendance classes and frequency count details into account (see Table 9 below for an example). All these tables were consequently used for detailed comparisons, which made it possible to look at the shifts within the groups to answer the questions at hand.

Table 9: Example of a frequency table for the Positive Group for the month of May 2013, which became one of the data sets reflected in figure 22.

Number of classes	8	Total individuals	104
Class interval/width	3	Class frequency	%
	<i>Gym attendance per month</i>		
Class limits	0	19	18%
	1-3	37	36%
	4 - 6	21	20%
	7 - 9	20	19%
	10 - 12	5	5%
	13 - 15	2	2%
	16 - 18	0	0%
	19 - 21	0	0%
22 - 24	0	0%	

Four key things had to be identified for each of the group's months: where did the group increase, where did it decrease, where were the approximate changes absorbed and how did it compare to the control. The third point mentioned, is a culmination of the first two, as a decrease in one area resulted in an increase in another, yet it provides an additional criterion for measuring effectiveness.

For example: if the Positive Group increased in a lower class, where did the growth come from? Did it come from one of the lower classes or a higher one? If it came from the lower classes, it implies that the intervention assisted in decreasing inactivity or increasing activity, which is beneficial. If it came from the higher classes, it implies that the intervention assisted in moving those who exercised a lot to a less frequent class, which is not ideal, as the goal is to get people to exercise more often. The first group, analysed in this manner, was the Control Group.

6.3.12 Control Group's growth and decline

Table 10 provides the data for the Control Group's 2013 and 2014 three months, as well as the percentage difference between the different years. The latter became especially important when comparing these results to the Positive and Negative Groups.

Table 10: Indicating the growth, decline and shifts of the Control Group over May, June and July from 2013 to 2014.

	Class limits	May			June			July													
		Class frequency		Difference	Class frequency		Difference	Class frequency		Difference											
		13	14		13	14		13	14												
CONTROL Total (n) = 104	0	14.4%	↑19.2%	4.8%																	
	1-3	33.6%	↓30.7%	-2.9%																	
	4 - 6	25.9%	↓18.2%	-7.7%																	
	7 - 9	12.5%	→12.5%	0.0%	Total decline	-12.5%	19.2%	↓15.3%	-3.9%	Total decline	-10.6%	22.1%	↓15.3%	-6.8%	Total decline =	-18.4%					
	10 - 12	8.6%	↑13.4%	4.8%	Shifted	12.4%	4.8%	→4.8%	0.0%	Shifted	10.6%	9.6%	↓5.7%	-3.9%	Shifted =	18.1%					
	13 - 15	3.8%	↓1.9%	-1.9%		4.8%	1.9%	↑3.8%	1.9%		0	4.8%	↓3.8%	-1.0%		0	11.5%				
	16 - 18	0.9%	↑2.8%	1.9%		10 - 12	4.8%	0.0%	↑2.8%	2.8%		4 - 6	4.8%	↓0.9%	-1.0%		4 - 6	3.8%			
	19 - 21	0.0%	↑0.9%	0.9%		16 - 18	1.9%	0.0%	→0.0%	0.0%		13-15	1.9%	0.0%	↑1.9%	1.9%		19-21	1.9%		
	22 - 24	0.0%	→0.0%	0.0%		19 - 21	0.9%	0.0%	→0.0%	0.0%		16-18	2.8%	0.0%	↑0.9%	0.9%		22-24	0.9%		

May had a total positive shift of 12.4% (the sum of all the percentage increases of the various class limits). This aspect, encompassing total percentage increases, was made up of activity transfers to the zero, '10 to 12', '16 to 18' and '19 to 21' classes. The biggest increases, however, took place in the zero class, with 4.8% of the 104 people becoming

inactive. The '10 to 12' class also increased by 4.8%, meaning that the class whose gym-activity nearly qualifies as 'enough exercise' in order to reap the health benefits, has increased. The two larger classes (between '16 to 18' and '19 to 21') grew by 1.9% and 0.9% respectively.

The total percentage declines (the sum of the decreasing percentages in various classes) came from the '1 to 3', '4 to 6' and '13 to 15' classes respectively. The biggest declines, however, came from the '4 to 6' (7.7%) and '1 to 3' (2.9%) classes. This means that those who exercised less (one to three and four to six times a month) either became more inactive (moved to zero) or they became more active by moving into the '10 to 12', '16 to 18' or '19 to 21' classes.

When looking at June a similar picture emerges, with a sum total of 10.6% in positive shifts. Class increases were observed in the zero, '4 to 6', '13 to 15' and '16 to 18' classes. The decline came again from the smaller classes of '1 to 3' and '7 to 9'. This is a further indication that those who exercised less frequently ('1 to 3' and '7 to 9' times a month) shifted to become more inactive (zero although it was a very small amount of people that moved to this class) or more active ('4 to 6' or '15 to 16' times a month).

July had a slightly different picture starting with an 18.1% increase. This took place in the zero, '4 to 6', '19 to 21' and '22 to 24' classes, while decreases took place in '1 to 3' and '7 to 18' classes. This is slightly different to the previous months as the higher groups contributed the most losses. This means that July was a bit extreme. It lost people who usually exercised more frequently (seven to 18 times a month) and mainly increased those who visited the gym less frequently (zero or four to six times a month) or those who visited the gym a lot (19 to 24 times a month).

In summary: May and June saw the smaller gym frequency classes shrink in order to grow the higher classes. July saw the middle frequency gym classes shrink in order to grow the smaller or really big classes. The next section will unpack the findings for the Positive Group.

6.3.13 Positive Group's growth or decline

Table 11 below provides an in-depth analysis of May's Positive group. A total positive shift of 13.4% in May compared to the Control's 12.4% took place. This 1% difference is already an indication that the Positive Group had an impact. The increases were slightly different to those of the Control. The Control Group had an increase in the zero class whilst the Positive did not. The Positive Group had increases in both '1 to 3' and '13 to 15' classes while the Control Group did not. Both the Control and Positive Groups had increases in the '10 to 12' and '16 to 18' classes, but the Positive Group had lower growth in both instances. The Control Group also had a small increase of 0.9% in the '19 to 21' class, which the Positive Group did not have at all.

Table 11: Indicating the growth, decline and shifts of the Positive Group over May 2013 and 2014 while comparing the results to the Control Group.

	Class limits	May				Comparison (comparing 2013 with 2014, result with Control)	POSITIVE		CONTROL	
		Class frequency		Positive Difference	Control Difference		Shifted	13.4%	Shifted	12.4%
		2013	2014							
POSITIVE Total (n) = 82	0	14.6%	↓	12.2%	-2.4%	4.8%				
	1-3	23.1%	↑	31.7%	8.6%	-2.9%			0	4.8%
	4-6	32.9%	↓	26.8%	-6.1%	-7.7%				
	7-9	15.8%	↓	10.9%	-4.9%	0.0%				
	10-12	12.2%	↑	14.6%	2.4%	4.8%			10-12	4.8%
	13-15	1.2%	↑	2.4%	1.2%	-1.9%				
	16-18	0.0%	↑	1.2%	1.2%	1.9%			16-18	1.9%
	19-21	0.0%		0.0%	0.0%	0.0%			19-21	0.9%
	22-24	0.0%		0.0%	0.0%	0.0%				

One can easily say that the positive intervention had a negative effect on gym behaviour, because it resulted in people changing their behaviour from high frequency gym visits (19 to 20 times a month for instance) to lower monthly gym visits. The answer, however, requires more deliberation than that.

Overall gym attendance increased. The zero-group or the inactive group decreased, indicating that more people became active. More people started to gym between one to

three and 13 to 15 times a month, which the Control Group did not reflect. Subsequently, the more important question to ask is: what is most important – a host of people visiting the gym more often or a handful of people visiting the gym a lot? If the answer is the latter, then positive text messages will not deliver the desired result. If the goal were to get more people to the gym more often, positive messages would have the desired effect.

When looking at June in Table 12, a similar picture emerges. This time around the Control Group had a bigger positive-percentage shift than the Positive Group, indicating that the positive intervention had less of an impact. The Control Group reflected an increase in the zero class once again, whilst the Positive Group did not. The Positive Group was the only one to grow in the '1 to 3' class. Both groups grew in the '4 to 18' class; however the Control Group always superseded the Positive Group.

Table 12: Indicating the growth, decline and total positive or negative shifts of the Positive Group over June 2013 and June 2014, whilst comparing the results to the Control Group.

	Class limits	June				Comparison (comparing 2013 with 2014, result with Control)	POSITIVE		CONTROL	
		Class frequency		Positive Difference	Control Difference		Shifted	8.5%	Shifted	10.6%
		2013	2014							
POSITIVE Total (n) = 82	0	15.8%	↓ 14.6%	-1.2%	1.0%			0	1.0%	
	1-3	30.4%	↑ 32.9%	2.5%	-6.7%	1-3	2.5%			
	4-6	25.6%	↑ 29.2%	3.6%	4.9%	4-6	3.6%	4-6	4.9%	
	7-9	17.0%	↓ 15.8%	-1.2%	-3.9%	13-15	1.2%	13-15	2%	
	10-12	9.7%	↓ 3.6%	-6.1%	0.0%	16-18	1.2%	16-18	2.8%	
	13-15	0.0%	↑ 1.2%	1.2%	1.9%					
	16-18	1.2%	↓ 2.4%	1.2%	2.8%					
	19-21	0.0%	0.0%	0.0%	0.0%					
	22-24	0.0%	0.0%	0.0%	0.0%					

The same arguments can be made for June as for May: the higher classes lost some of their individuals whom were added to the lower classes. Subsequently, to summarise the previous argument: If the objective were to get a host of people to visit the gym more often, the positive intervention would work. If it is to get a handful of people to visit the gym a lot, it will not have the desired effect.

July on the other hand, was quite different (see [Table 13](#)).

Table 13: Indicating the growth, decline and the total positive or negative shifts of the Positive Group over July 2013 and July 2014, when comparing the results to the Control Group.

	Class limits	July				Comparison (comparing 2013 with 2014, result with Control)	POSITIVE		CONTROL	
		Class frequency		Positive Difference	Control Difference		Shifted	12.1%	Shifted	18.1%
		2013	2014				0	3.6%	0	11.5%
POSITIVE Total (n) = 82	0	12.2%	15.8% ↑	3.6%	11.5%	4-6	2.4%	4-6	3.8%	
	1-3	30.4%	28.0% ↓	-2.4%	-5.7%	7-9	3.7%			
	4-6	26.8%	29.2% ↑	2.4%	3.8%	16-18	2.4%			
	7-9	10.9%	14.6% ↑	3.7%	-6.8%			19-21	1.9%	
	10-12	12.2%	4.9% ↓	-7.3%	-3.9%			22-24	0.9%	
	13-15	6.1%	3.6% ↓	-2.5%	-1.0%					
	16-18	1.2%	3.6% ↑	2.4%	-1.0%					
	19-21	0.0%	0.0% →	0.0%	1.9%					
	22-24	0.0%	0.0% →	0.0%	0.9%					

The Control Group had a much bigger percentage shift at 18.1% compared to the Positive Group's 12.1%. However, the Control's increase was mainly due to the 11.5% increase in the zero class. The Positive Group's zero class also increased, but by only 3.6%. Fewer people subsequently became inactive in the Positive than the Control Group.

Both groups increased in the '4 to 6' classes, although the Positive Group was a bit behind that of the Control with a 2.4% versus a 3.8%. The '7 to 9' and '16 to 18' classes grew substantially in the Positive Group whereas the Control Group did not, whilst the Control Group grew in the '19 to 24' classes the Positive Group did not. The big point to notice, however, is that the Control Group's big classes did not deliver the same big growth as the middle classes of the Positive Group.

The Positive Group's increases were more evenly spread across the classes, from entry level ('0 to 6'), to mid-level ('7 – 9') and high level ('16 to 18') classes. The Control Group on the other hand, either grew the entry-level ('0 to 6') or high-end ('19 to 24') classes. The argument in May and June can subsequently be amended slightly for July: if the objective is to get a host of people visiting the gym more often across a spread of exercise frequencies, the positive intervention would work. If it is to get a handful of people to visit the gym a lot, it will not yield the desired results.

In general, the positive intervention had a positive effect. Yes it might have resulted in a drop within those who exercised a lot, but it increased the overall activity of the total group. It decreased the zero-group, making more people active, and it spread the exercise frequencies out more evenly - migrating some to higher exercise frequency classes. The Control Group was in general (except for June) much more extreme in nature – you either exercised a little, a lot or none at all, with very few observations in-between.

6.3.14 Negative Group’s growth and decline

The Negative Group’s May pattern looked quite different to that of the Positive Group. Table 14 shows how instead of impacting the zero class and spreading the exercise more evenly, it impacted fewer groups in a bigger way. The ‘7 to 9’ class had the biggest increase, followed by the ‘13 to 15’ class. The Control Group did not increase in these classes, but rather in its zero, ‘10 to 12’ and ‘19 to 21’ classes. Both grew in the ‘16 to 18’ class, however the Negative Group increased with 4.2% versus the Control’s 1.9%.

Table 14: Indicating the growth, decline and total positive or negative shifts of the Negative Group over May 2013 and May 2014, when comparing the results to the Control Group.

	Class limits	May				Comparison (comparing 2013 with 2014, result with Control)	NEGATIVE		CONTROL		
		Class frequency		Negative Difference	Control Difference		Shifted	16.9%	Shifted	12.4%	
		2013	2014								
NEGATIVE Total (n) = 95	0	15.7%	➡	15.7%	0.0%	4.8%	No change 2013:0% (more active) Lose Control:+5% (more inactive)	7-9	9.5%	10 - 12	4.8%
	1-3	21.0%	➡	21.0%	0.0%	-2.9%	No change 2013:0% Beat Control:-3%	13-15	3.2%	16 - 18	1.9%
	4 - 6	29.4%	➡	25.2%	-4.2%	-7.7%	Lose 2013:-4% Beat Control:-8%	16 - 18	4.2%	19 - 21	0.9%
	7 - 9	12.6%	➡	22.1%	9.5%	0.0%	Beat 2013:9% Beat Control: 0%				
	10 - 12	14.7%	➡	5.2%	-9.5%	4.8%	Lose 2013:-10% Lose Control:+4%				
	13 - 15	3.1%	➡	6.3%	3.2%	-1.9%	Beat 2013:+3% Beat Control:-2%				
	16 - 18	0.0%	➡	4.2%	4.2%	1.9%	Beat 2013:+1% Beat Control:+2%				
	19 - 21	2.1%	➡	0.0%	-2.1%	0.9%	Lose 2013:-2% Lose Control:+1%				
	22 - 24	1.0%	➡	0.0%	-1.0%	0.0%	Lose 201:-1% Lose Control:0%				

It seems as though the negative intervention had a greater impact on the mid to high classes compared to the positive intervention. The same thing happened with the Negative

as with the Positive Group. Those who exercised a lot got converted into exercising less, however it was a much higher group compared to the Positive.

The Positive Group had high traction in the smaller classes while spreading the rest of the effects throughout the mid and high classes. The Negative, on the other hand, converted low and high into the middle and upper classes. Subsequently, the argument for the Negative Group is: if the objective is to convert those who do have exercise routines into the mid and upper exercise-classes, then the negative intervention would work. If it is to convert those who do not exercise at all, or do very little, then it will not work.

June (depicted in table 15) paints a similar picture as seen in May, even though its positive-percentage shift was lower than the Control's (8.5% versus 10.6%). It again focused more on the mid and upper classes; however, two anomalies came to the fore. This time around it did increase the zero class, even more so than the Control, and it increased one of the very high classes. The Control Group on the other hand had a much more even spread from zero, '4 to 6', '13 to 15' and '16 to 18'.

Table 15: Indicating the growth, decline and total positive or negative shifts of the Negative Group over June 2013 and June 2014, when comparing the results to the Control Group.

	Class limits	June				Comparison (comparing 2013 with 2014, result with Control)	NEGATIVE		CONTROL	
		Class frequency		Negative Difference	Control Difference		Shifted	8.5%	Shifted	10.6%
		2013	2014							
NEGATIVE Total (n) = 95	0	15.7%	↑ 18.9%	3.2%	1.0%	Lose 2013: +3% (more inactive) Lose Control: +1% (more inactive)	0	3.2%	0	1.0%
	1-3	21.0%	→ 21.0%	0.0%	-6.7%	No change 2013: 0% Beat Control: -7%	7-9	3.2%	4-6	4.9%
	4 - 6	33.6%	↓ 25.2%	-8.4%	4.9%	Lose 2013: -9% Lose Control: +5%	13-15	1.1%	13-15	1.9%
	7 - 9	15.7%	↑ 18.9%	3.2%	-3.9%	Beat 2013: +3% Beat Control: -4%	16 - 18			2.8%
	10 - 12	8.4%	↔ 8.4%	0.0%	0.0%	No change 2013: 0% No change Control: 0%	19 - 21	1.0%		
	13 - 15	5.2%	↑ 6.3%	1.1%	1.9%	Beat 2013: +1% Lose Control: +2%				
	16 - 18	0.0%	→ 0.0%	0.0%	2.8%	No change 2013: 0% Lose Control: +3%				
	19 - 21	0.0%	↑ 1.0%	1.0%	0.0%	Beat 2013: +1% Beat Control: +0%				
	22 - 24	0.0%	0.0%	0.0%	0.0%					

This further confirms the hypothesis highlighted in the previous month: if the objective is to convert those who do have exercise routines, to exercise more in the mid and upper

classes, then the negative intervention would work. If it is to convert those who do not exercise at all, or do very little, then it will not work as it could actually increase inactivity.

July, however, was a bit of an anomaly as there was no real trend (see Table 16). Both groups had zero classes. Both had small to mid-classes, with the Negative Group increasing the '1 to 3' class and the Control Group increasing the '4 to 6'. Both had two high groups within the '19 to 21' class.

Table 16: Indicating the growth, decline and total positive or negative shifts of the Negative Group over July 2013 and July 2014, when comparing the results to the Control Group.

	Class limits	July				Comparison (comparing 2013 with 2014, result with Control)	NEGATIVE		CONTROL	
		Class frequency		Negative Difference	Control Difference		Shifted	12.7%	Shifted	17.2%
		2013	2014							
NEGATIVE Total (n) = 95	0	13.6%	↑ 22.1%	8.5%	11.5%	0	8.5%	0	11.5%	
	1-3	23.1%	↑ 24.2%	1.1%	-5.7%	1-3	1.1%			
	4-6	21.0%	↓ 18.9%	-2.1%	3.8%			4-6	3.8%	
	7-9	21.0%	↓ 12.6%	-8.4%	-6.8%	16-18	2.1%			
	10-12	10.5%	↓ 9.4%	-1.1%	-3.9%	19-21	1.0%	19-21	1.9%	
	13-15	9.4%	↓ 8.4%	-1.0%	-1.0%			22-24	0.9%	
	16-18	1.0%	↑ 3.1%	2.1%	-1.0%					
	19-21	0.0%	↑ 1.0%	1.0%	1.9%					
	22-24	0.0%	→ 0.0%	0.0%	0.9%					

It seems as though the Negative Group still has a tendency to increase the higher groups more so than any other group, even though it caused less active people to be more inactive.

The picture is less concise in the Negative Group. There seems to be an indication that negative interventions in general, increase the higher exercise frequency classes more so

than the lower classes. All the months had a pull towards the mid and higher end classes, with only July impacting a small '1 to 3' class.

With all the months looked at in isolation, the last step is to see if there was a holistic trend that developed over the three months.

6.3.15 Positive Group's trends

Table 17 provides a holistic overview of the Positive and Control Group over the 2013 and 2014 three-month intervention period. The green arrows indicate where the intervention worked, whilst the red indicate the opposite. A grouping was classified as green in two instances. The first: when the 2014 grouping outperformed its 2013 counterpart as well as the corresponding Control. An example would be the '1 to 3' class. May 2014 outperformed May 2013 with an 8.6% increase, whereas the Control Group had a 2.9% decline during the same comparable period. The second: when a 2014 period lost against its 2013 counterpart, yet still outperformed the declining Control, as it shows that the decline was slowed down by the intervention. An example would be the same '1 to 3' class, but for July. The Positive Group (28%) did not outperform its 2013 counterpart (30.4%) as it declined by 2.4%. The Control Group on the other hand declined by 5.7%. The Positive Group's decline was subsequently stunted by the intervention.

A once off increase or decrease in favour of the intervention can easily be seen as a coincidence. It therefore became important to look for more than one green arrow over the May to June period as it indicates a trend as opposed to a 'one hit wonder'. Table 17 below indicates three trends, as highlighted in grey.

Table 17: Indicating the growth and decline of the Positive Group over May, June and July of 2013 and 2014. Three trends lines were identified in the zero, 1 to 3 and 7 to 9 classes

	Class limits	May				Comparison <small>(comparing 2013 with 2014, result with Control)</small>	June				Comparison <small>(comparing 2013 with 2014, result with Control)</small>	July				Comparison <small>(comparing 2013 with 2014, result with Control)</small>
		Class frequency		Positive Difference	Control Difference		Class frequency		Positive Difference	Control Difference		Class frequency		Positive Difference	Control Difference	
		2013	2014				2013	2014				2013	2014			
CONTROL Total (n) = 104	0	14.4%	19.2%	4.8%	0	15.8%	19.2%	3.4%	1.0%	12.2%	15.8%	3.6%	11.5%			
	1-3	33.6%	30.7%	-2.9%	30.4%	32.9%	2.5%	-6.7%	30.4%	28.0%	-2.4%	-5.7%				
	4-6	25.9%	18.2%	-7.7%	25.6%	29.2%	3.6%	4.9%	26.8%	29.2%	2.4%	3.8%				
	7-9	12.5%	12.5%	0.0%	17.0%	15.8%	-1.2%	-3.9%	10.9%	14.6%	3.7%	-6.8%				
	10-12	8.6%	13.4%	4.8%	Beat 2013: +9% Lose 2013: -6%	9.7%	3.6%	-6.1%	0.0%	12.2%	4.9%	-7.3%	-3.9%			
	13-15	3.8%	1.9%	-1.9%	Lose 2013: -8%	0.0%	0.0%	0.0%	0.0%	6.1%	3.6%	-2.5%	-1.0%			
	16-18	0.9%	2.8%	1.9%	Beat 2013: +8% Lose 2013: -5%	1.2%	1.2%	1.9%	2.8%	1.2%	3.6%	2.4%	-1.0%			
	19-21	0.0%	0.9%	0.9%	Beat 2013: +1% Lose 2013: -2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%			
	22-24	0.0%	0.0%	0.0%	Beat 2013: +1% Lose 2013: +2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%			
	Total decline					Total decline				Total decline				Total decline		
						Shifted				Shifted				Shifted		

The first trend in the zero class shows how the intervention got more people active, as it decreased from 2013 to 2014 by 3% while its Control Group increased by 5%, thus more people became inactive in the latter group. The same thing happened in June, although the decline in 2014 compared to 2013 was only with 1%. The Control, on the other hand, increased with 1%, making more people inactive once again. In both these months the intervention assisted in getting people more active, which is not what the Control Group was doing.

July was a little different in that the 2014 numbers increased by 4%. People therefore became more inactive during the intervention period. However, the Control Group increased significantly more at 11%. To only increase by 4% when the trend is 11%, means something must have taken place in order to stunt the increase – in this case, the positive goal-framed text messages. This trend subsequently answers the question: the positive intervention assisted in curbing inactivity growth by getting people to exercise in some shape or form.

The second trend is in the ‘1 to 3’ class and shows how people started to exercise more. A total increase of 9% was added to the ‘1 to 3’ times a month exercise class in May 2014 compared to the same month in 2013. The Control Group on the other hand, lost people and therefore declined by 3%. The same scenario played out in June, with 2014 growing by 3%, whilst the Control Group declined even further (7%). In both these months the intervention helped to grow the ‘1 to 3’ times a month exercise class.

July 2014 seemed to have been an anomaly all-round as it did the complete opposite to the other two months, as in the case of the zero class – it decreased by 2%. However, the Control Group (just like the previous class) decreased yet again by 6%. The intervention clearly helped to curb the loss by declining at a lower rate compared to the Control Group trend.

The last trend in the '7 to 9' group is slightly weaker compared to the previous two discussed, as it only runs across two months and not three. June 2014 declined by 1%, whilst the Control Group declined by 4%. The positive intervention therefore helped to stunt the decline, similar to what was seen in the previous two trends. July on the other hand, saw a 4% increase whereas the Control Group declined by 7%. The intervention helped to increase people's activity level in the face of a downward trend. Even this weaker trend subsequently reinforces that which was already identified in the previous two stronger trends. The positive intervention assists by slowing down the rate of people exercising less when in a declining trend, and it assists in getting more people active in the face of a declining trend.

An important note, however, is that these trends only come to the fore in selected groups. It does not have the same effect on everyone. Only the zero, '1 to 3' and '4 to 7' classes indicated a definite shift, with the strongest pull being in the zero and '1 to 3' classes. This is a further confirmation that the positive intervention had a stronger effect on those who had been exercising for a limited number of times such as never, 1 to 3 times or even 7 to 4 times (perhaps to a lesser degree) a month.

6.3.16 Negative Group's trends

Table 18 provides the exact same analysis approach as was done for the Positive Group.

Table 18: Indicating the growth and decline of the Negative Group over May, June and July of 2013 and 2014. The results were then checked for a trend-line against the respective Control Groups.

	Class limits	May			Comparison (comparing 2013 with 2014, result with Control)	June			Comparison (comparing 2013 with 2014, result with Control)	July			Comparison (comparing 2013 with 2014, result with Control)		
		Class frequency		Difference		Class frequency		Difference		Class frequency		Difference			
		13	14			13	14			13	14				
CONTROL Total (n=204)	0	14%	↑ 19%	5%		18%	↑ 19%	1%		12%	↑ 23%	11%			
	1-3	34%	↓ 31%	-3%		36%	↓ 29%	-7%		28%	↓ 22%	-6%			
	4-6	26%	→ 18%	-8%		20%	↓ 25%	-5%		22%	↓ 26%	-4%			
	7-9	13%	→ 13%	0%		19%	→ 15%	-4%		22%	↓ 15%	-7%			
	10-12	9%	↑ 3%	4%		5%	→ 5%	0%		10%	↑ 6%	-4%			
	13-15	4%	↓ 2%	-2%		2%	↑ 4%	2%		5%	↑ 4%	-1%			
	16-18	1%	↑ 3%	2%		0%	↑ 3%	3%		2%	↓ 1%	-1%			
	19-21	0%	↑ 1%	1%		0%	→ 0%	0%		0%	↑ 2%	2%			
22-24	0%	→ 0%	0%		0%	→ 0%	0%		0%	↑ 1%	1%				
NEGATIVE Total (n=458)	0	16%	→ 16%	0%	No change 2013: 0% (more active) Lose Control: +3% (more inactive)	16%	↑ 19%	3%	1%	14%	↑ 22%	8%	11%	Lose 2013: +3% (more inactive) Lose Control: +1% (more inactive)	
	1-3	21%	→ 21%	0%	No change 2013: 0% Beat Control: -3%	21%	→ 21%	0%	-7%	23%	↑ 24%	1%	-6%	No change 2013: 0% Beat Control: -7%	
	4-6	29%	↓ 25%	-4%	Beat Control: -8%	34%	↓ 25%	-9%	5%	21%	↓ 19%	-2%	4%	Lose 2013: -8% Lose Control: -5%	
	7-9	13%	↑ 22%	9%	Lose 2013: -4% Lose Control: -4%	16%	↑ 19%	3%	-4%	21%	↑ 13%	-8%	-7%	Beat 2013: +3% Beat Control: -4%	
	10-12	15%	↓ 5%	-10%	Lose 2013: -10% Lose Control: -4%	8%	↑ 8%	0%	0%	11%	↓ 9%	-2%	-4%	No change 2013: 0% Lose Control: -9%	
	13-15	3%	↑ 6%	3%	Beat 2013: -9% Beat Control: -2%	5%	↑ 6%	1%	2%	9%	↓ 8%	-1%	-1%	Beat 2013: +1% Lose Control: -2%	
	16-18	0%	↑ 4%	4%	Lose 2013: -2% Beat Control: +2%	0%	↑ 0%	0%	3%	1%	↑ 3%	2%	-1%	No change 2013: 0% Lose Control: -8%	
	19-21	2%	↓ 0%	-2%	Lose 2013: -1% Lose Control: +1%	0%	↑ 1%	1%	1%	0%	↑ 1%	1%	2%	Beat 2013: +1% Beat Control: -4%	
	22-24	1%	↓ 0%	-1%	Lose 2013: -1% Lose Control: 0%	0%	0%	0%	0%	0%	→ 0%	0%	0%	1%	No change 2013: 0% Lose Control: +1%

The important elements are again the green arrows (indicating when the intervention worked) and the red arrows (indicating when it didn't work). In order to avoid any coincidences, trends (more than one green arrow) were again identified, as highlighted in grey. Note however that the Negative Group is made up of one strong and two weaker trends, compared to the two strong and one weaker trend in the Positive Group.

The first trend is in the '1 to 3' class across the months of May to July. May 2014 stayed constant at a 0%. The Control Group on the other hand decreased by 3%. This means that the Negative Group was able to withstand losing people whilst the Control Group probably added its 3% to the 'zero times a month' class, which increased by 5%. June was exactly the same. June 2014 stayed constant, whereas the Control, for the same time period, decreased by 7%. July was similar in that it increased with 1%, while the Control Group decreased with 6%. This is a clear indication that the intervention assists in slowing down declines and, in one instance, growing in the face of a decline.

The second trend is in the '7 to 9' class and is one of the weaker observations, with only May and June indicating a positive shift. May 2014 increased with 9% while the Control Group increased with 0%. June on the other hand increased with 3% whilst the Control Group decreased by 4%.

Both these trends show similar findings as in the Positive Group. However, even though both groups are indicating similar findings, the magnitude differs. The Positive Group's growth is higher in comparison. May showed a 9% increase for the Control Group while

the Negative was flat. June showed a 3% increase whilst again being flat in the Negative Group. Only July declined with 2% and yet the Negative Group's increase was a miniscule 1%. Therefore the likelihood that a positive intervention would deliver better results compared to a negative intervention, within a lower monthly exercise group, is high.

Trend number three is the only split trend, meaning it's made up of May and July. May increased with 4% while the Control Group grew by 2%. The intervention consequently accelerated growth. June, however, was flat whilst the Control Group increased by 3%, meaning the intervention did nothing to increase the amount of people in the '16 to 18' group. July on the other hand, increased by 2% while the Control Group decreased by 1%. When looking at it cumulatively, it becomes clear that the negative intervention managed to get more people to exercise within this class even though it did nothing in June. When combining all the growth and decline numbers for the three months, the Negative Group equates to 6% total increase whereas the Control Group showed a 4% increase.

Also note that the Negative Group is the only group with a trend in such a high grouping. The hypothesis that negative interventions would work better on those who tend to have a higher monthly exercise rate, whilst the positive intervention would have a bigger impact on those in the lower monthly exercise groups, is as a result strengthened.

6.4 OVERALL FINDINGS

To pretend that a weekly sms over a three-month period during winter would have a massive impact is to have the wrong expectation. The impact of the interventions should thus not be inflated to seem extremely effective, just because trends were observed and monthly exercise shifts to higher classes took place. The effects were miniscule and even just coincidences as the ANOVA test indicates. The fact that a real effect could not be detected until an in-depth analysis was done is an indication of the degree of effectiveness which these text message had - minimal. The results should as such be considered as an indication rather than fact.

That being said, there is a definite indication from the frequency distribution tables, that both positive and negative text messages had an effect. The most important effect to note is the positive intervention, as it shifted individuals from inactivity (zero class) to activity

(potentially the '1 to 3' class). More people became active! It might not be the recommended number of times, but it is a start. It also got people to move into the entry-level classes of '1 to 3' and '4 to 6'. Yes the decline of the higher exercise classes could have contributed to the growth of these lower classes, which is not ideal, but the 'size of the prize' in getting the lower classes active is so much bigger than losing the 2% or 3% of those who exercise more than 16 times a month.

Yet, as was stated on numerous occasions throughout this study, exercising less than 11 times a month is not enough to reap the specified health benefits. To subsequently say the study was a success, because there was a shift out of inactivity into a '1 to 3' or '4 to 6' exercise class, is short sighted. People need to exercise more than 12 times a month in order to reap the benefits and neither intervention was able to assist in reaching this target. A combination of a positive and negative text message would potentially have had a higher likelihood of reaching the specified target.

Most of the groups who responded well to the positive framed message did not respond well to the negatively framed message. Those who were already exercising a bit more however, such as '4 to 6' or even '10 to 12' times a month, seem to respond better to the negatively framed messages. The result was an increase in the higher groups, such as 7 to 9 and 16 to 18 times a month, making the chance of reaching the target of 12 times a month much more likely.

In light of the above, the research objectives can be answered as follows:

2. The negative goal-framed messages did have a small impact on those who were found to make Dynamic Inconsistent decisions with regards to gym behaviour. However this intervention did not assist gym visitors to visit the gym more than 12 times a month.
 - a. Numerous analyses techniques were used to ascertain if the gym behaviour changed when comparing the same time periods of 2013 and 2014. The answer is yes and no. The ANOVA test results conclude that there was no real statistical significant change and that the results were more coincidental rather than the actual communication intervention. Yet when looking at the

data on a more granular level behaviour change was observed between 2013 and 2014.

- b. The assumption of one type of messaging performing 'better' than the other was found to be incorrect due to the fact that both communication interventions performed different functions. There is a high indication that a Negative goal-framed message will have a bigger impact on the higher gym exercise groups and a deterring effect on the lower to no gym exercise groups. These findings were however based on weaker data than the Positive goal-framed intervention.
3. The Positive goal-framed message did have a small impact on those who were found to make Dynamic Inconsistent decisions with regards to gym behaviour. However this intervention did not assist gym visitors to visit the gym more than 12 times a month.
 - a. The same answer as in 2.a's research question about whether 2014 outperformed 2013 apply: yes and no. The ANOVA test states that it is coincidence, thus no. But the data on a granular level shows that there was change between 2013 and 2014 thus yes.
 - b. As stated in 2.b above, the starting assumption was incorrect. Where the Negative goal-framed message had a bigger impact on the higher exercise group, the Positive goal-framed messages had an effect on the lower to no gym exercise groups, resulting in making people active. The evidence however was stronger for this messaging type to be effective than the Negative goal-framed message, even though different functions were being performed.

6.5 CONCLUSION

The aim of this chapter was to provide a better understanding of how the data was analysed for Phase One and Two, as well as the findings for the overall research project.

Phase One started with a workable sample of 446 respondents who exercised less than 11 times a month. A total of 93 respondents exercised more than 12 times a month and became the comparative group. It was subsequently analysed in conjunction with the infrequent group, so that richer insights into the workable sample could be given. A simple coding system was used across both groups in order to identify individuals who made Dynamic Inconsistency gym related decisions.

Most respondents across the two groups made Dynamic Inconsistent decisions at some point. With the help of statistical analysis, a slight negative correlation was found across both groups, suggesting a slight tendency towards an “*exercise-increase/Dynamic Inconsistent decision-decrease*” relationship. The difference between the two, however, was the degree of this relationship. Those who exercised less than 11 times a month had a much higher Dynamic Inconsistency score than those who exercised more than 12 times a month. The conclusion that people who exercised less were slightly more likely to make gym related Dynamic Inconsistent decisions than those who exercised more frequently, was therefore made and proved why this group were in need of an intervention.

Then Phase Two kicked into gear. The 446 individuals of Phase One became the population for Phase Two and were divided into a Positive-, Negative- and Control Group as described in section 5.8.3.

The Positive and Negative Groups were exposed to the two framing messages, whereas the Control Group was only observed. The interventions were administered through one text message a week, over a three-month period. Numerically discrete ratio data was gathered in order to make use of both descriptive and inferential statistical methods.

It was very difficult to detect the communication intervention’s impact when looking at the data holistically. Descriptive statistics as well as inferential statistics in the form of an ANOVA test came to the same conclusion: the interventions had no effect and the results were mere coincidence. This was not surprising due to the intervention only taking place once a week over a 12-week period.

However, before these results could be accepted, a more detailed approach was followed in order to see if the use of averages might have hidden the impact that might have taken place on a more granular level. More descriptive statistics were used and found that the interventions did have an effect on various levels.

The positive goal-framed messages assisted in moving people out of inactivity and into activity. It also supported those who exercised infrequently a bit more. The negative intervention assisted in getting those who exercised moderately to exercise more often, while making those didn't exercise a lot, exercise even less. Neither intervention however achieved the goal of getting people to exercise more than 12 times a month.

It must also be noted that the impact of these interventions were miniscule and should be taken as indications rather than fact. More research would need to be done in order to give more credibility to these findings. The second and third research objectives were subsequently answered: both interventions did affect gym behaviour by fulfilling different functions, but not enough for individuals to experience the health benefits associated with enough exercise.

CHAPTER 7: QUALITY AND RIGOUR OF RESEARCH DESIGN

Chapter outline:

The purpose of this chapter is to:

- Define the concept of validity and reliability
- Describe the different types and application of validity
- Explain the different types and application of reliability
- Clarify the steps taken in ensuring the study is ethical

7.1 INTRODUCTION

Establishing the quality of the research design is very important as it relates to the quality of the research findings. Even though findings can never be guaranteed as being hundred

per cent correct, everything possible must be done to reduce the possibility of getting the answer incorrect (Saunders *et al.*, 2012;192).

The aim of this section is therefore to discuss the reasons why the research's design, methods and techniques were sound, resulting in the valid and reliable results already discussed.

7.2 UNDERSTANDING VALIDITY

Definitions about validity generally refers to the extent to which a concept, conclusion or measurement is logical and a true reflection of the real world (Cram101 textbook reviews, 2013). It is therefore about data and methods that are accurate, honest and on target (Denscombe, 2003:301). Saunders *et al.* (2012:684) offers two definitions for this construct. It is either the extent to which the data collection method accurately measures what it intend to measures or it is when findings are really about what they profess to be about. From these definitions one thing becomes clear: validity relates to accuracy within the methods and findings context.

One of the most problematic aspects of assessing validity is the varying terminology used to describe it (Bowling, 2004: 11). A host of validity types are available to a researcher. Babbie (2011:160) describes face, criterion, content, construct, internal and external validity; while McBurney and White, (2010:173) mentions only internal, construct, external and statistical validity. Judd and Kenny (1981:18) also mention internal, external and construct validity, but add another in the form of conclusion validity. Saunders *et al.* (2012:684) offers the most extensive list with construct, predictive/criterion, ecological, face, internal and measurement validity. Regardless of the type used to describe the results or measurement tool every single validity type address the same issue: the degree of confidence that can be placed in them (Bowling, 2004:11).

As there is no clear set of validity measures, the researcher investigated all validity types mentioned. It became evident that numerous types cited fell into external validity as appose to being a standalone validity type. The following validity types will subsequently

be covered in separate sections, as it is the most relevant to the study conducted: external, internal, measurement and ecological validity

7.3 EXTERNAL VALIDITY

External validity relates to the extent to which the research results can be generalised to all relevant situations (Saunders *et al.*, 2012:671) and is the most difficult validity to achieve (Judd & Kenny, 1981:39). The following strategies were implemented in order to enhance the external validity of the study (Du Plooy, 2009:186; Leedy & Ormrod, 2013:103):

- a. *A real life setting*: Even though laboratory experiments provide more control, it is artificial which can influence results. Consequently a real life research project may be more valid as it yields results with broader application. The results are more usable as it simulates real life, hence the reason why it can be applied to other real world settings (Du Plooy, 2009:186; Leedy & Ormrod, 2013:103).

As individuals were not taken out of their everyday life for either Phase One or Two, the findings can be applied to other exercise settings. The health club partner can make use of positively framed messages to get those who don't exercise at all or just a little bit to become more active. They can also use negatively framed to get those who exercise more frequently to exercise even more. These messages can be applied to anyone, thus not only those with Dynamic Inconsistency, as Phase One indicated that everyone has some form of it.

- b. *A representative sample*: Simple random sampling was used for both Phase One and Two (see section 5.8.2 for a detailed discussion of this process). It was therefore representative of the health club partner's population who did not have any chronic diseases.
- c. *Ensure the control and experimental group is almost exactly the same except for the independent variable being applied to the experimental group* (Du Plooy, 2009:186; Leedy & Ormrod, 2013:103). This was again achieved through the use of

simple random sampling in Phase Two. All three groups were as a result representative.

- d. *Replication in a different context*: a study is more valid when it delivers the same results after conducting it again in a similar or diverse setting (Du Plooy, 2009:186; Leedy & Ormrod, 2013:103). No replication has been done due to the study being a first of its kind.

7.4 INTERNAL VALIDITY

Internal validity deals with the extent to which the design can account for all the factors that may affect the outcome of the research results (Du Plooy, 2009:90). Even though all studies need to be mindful of it, experimental designs need to take extra precautions (therefore Phase Two), as the intent of the study is to identify a cause and effect relationship (Leedy & Ormrod, 2013:102).

The following factors influence internal validity (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193). Strategies have therefore been included in order to improve the study's internal validity:

- a. *Past and recent events*: Social and personal changes that take place between measurements can produce a change in an individual's perceptions. This in turn can bring forth an unanticipated change in the independent variable (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193).

This was a concern for the study as other factors could influence whether people visit the gym or not. Subsequently the study focused on individuals who had been with the gym for at least two years. This provided the researcher with an idea of their typical gym behaviour, particularly over the intervention period the year before.

Moreover an indication that other factors besides situational was impacting gym behaviour were already present. Phase Two only looked at those who visited the gym on average less than 11 times a month which was determined over the length of their membership. This provided grounds for the assumption that Dynamic

Inconsistency existed, as it is highly unlikely for an individual to be in ad hoc circumstances that impact their gym behaviour for a year let alone two, three or more.

- b. *Maturation*: individuals develop new abilities over a period of time that is not produced by the independent variable (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193).

As the individuals were struggling with low gym attendance for quite some time the behaviour was entrenched already. Moreover the three-month autumn/winter period chosen for the study is a particularly difficult period to convert people to gym more often, as it is known for its seasonal exercise decline (Shephard & Aoyagi, 2009:251). A dramatic organic change was thus highly unlikely, an assumption that was proved to be correct.

- c. *Testing*: When people know they are involved in a research project, they may become sensitised by the measuring instrument when it is applied the first time. This can then bias their behaviour or attitudes towards the topic being investigated which in turn impacts the results. In addition, if subjects become familiar with the experimental task or measuring instrument, learning takes place which can also affect future performance or responses (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193).

Participants in Phase Two did not know the aim was to influence their gym behaviour. They could therefore not be sensitised by the instrument. Moreover the fact that learning took place in the form of people moving from the inactive to active group is a good thing, as it showed the intervention had an effect.

- d. *Subject mortality*: If a study extends over a long period of time, individuals who are included in the original study may be difficult or impossible to trace. Their exclusion can consequently skew the results (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193).

This phenomenon did not occur, as the study took place over three consecutive months. Moreover the individuals were observed on a continuous basis over the time period. Any participant who did not finish the three-month period was excluded. All respondents in the final three groups were thus part of the whole experiment.

- e. *Demand variables*: Lengthy questionnaires and long periods of focused attention should be avoided because they can result in subject fatigue. The responses at the end may therefore differ from those in the beginning (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193). Phase One's questionnaire took about 5 minutes and Phase Two didn't need any kind of focused attention from the individuals, as they were observed.
- f. *Unobtrusive measures*: When people are unaware that their actions are being recorded they are being unobtrusively measured (Du Plooy, 2009:92; Leedy & Ormrod, 2013:102; Saunders *et al.*, 2012:193). This was the case in Phase Two and assisted in increasing its internal validity.

7.5 MEASUREMENT VALIDITY

Measurement validity is the degree to which a test or measuring instrument actually tests or measures what it claims to measure or test. By claiming a measure is valid, it also implies it is reliable as a measure cannot be valid if it is not reliable (Du Plooy, 2009:135).

Consequently the validity of the methods used in Phase One and Two had to be tested.

7.5.1 Phase One's measurement validity: Exercise Consistency Questionnaire

Litwin (1995:35) states that there are several types of validity that needs to be measured when assessing the performance of a survey instrument. Face, content, criterion and construct validity are the most important and was used in the study. The following section will explain and apply these techniques to the Exercise Consistency Questionnaire:

7.5.1.1 Face validity

Face validity is often confused with content validity even though the two are very different (Goodwin, 2010:132). Saunders *et al.* (2012:671) fell into this trap by defining validity and content validity as a question, scale or measure that appears to reflect accurately what it was intended to measure. This is in actual fact more face validity when considering Babbie's (2011:160) explanation that it is the quality of an indicator that makes it seem like a reasonable measure of some variable. Nestor and Schutt's (2011:120) have a simpler explanation in that it is when a test "looks like" it measures what it is supposed to measure. Both Goodwin (2010:564) and McBurney and White (2010:131) concur with this point of view stating that it is when a test appears superficially to test what it is supposed to test.

The problem with this type of validity is that it is essentially an opinion and lacks a firm scientific or empirical basis, resulting in adding little to no validation to a test (Nestor & Schutt's, 2011:120). Most researchers as a result do not consider it an important indicator of validity (Goodwin, 2010:564). It should therefore always be used in conjunction with other methods (Leedy & Ormrod, 2013:89; Litwin, 1995:34).

Nonetheless the researcher considered it when developing the Exercise Consistency Questionnaire. The survey was sent out to five independent individuals to get feedback about its face validity. All agreed that it measured different types of excuses, which could persuade you not to visit the gym. The questionnaire therefore had face validity.

7.5.1.2 Content validity

The main concern of content validity is whether the test items within the measurement tool have sufficient scope to capture the full range of the construct that is being measured (Nestor and Schutt's, 2011:121). Simply put it means a measurement tool should sample the range of behaviours represented by the theoretical concept being tested (Babbie, 2011:161; McBurney & White, 2010:131).

This type of validity comes into play right at the start of the measurement tool development as it focuses on the precise wording of the test items, as well as whether each attribute is being assessed with a specific item within the tool (Goodwin, 2010:132). Judgment about whether all aspects of the attribute are being covered is usually made by a panel, after a literature review, focus groups and exploratory interviews with the target population have been done (Bowling, 2004:11).

This particular validity was applicable to Phase One due to the development of the Exercise Consistency Questionnaire, which was discussed in detail in section 5.9.2 The important part to highlight is the fact that a focus group of lapsed users was conducted in order to identify those key excuses that stands in the way of individuals making it to the gym. These questions were divided into eight excuse themes as can be seen by Appendix A. This therefore addresses the first key element highlighted in the content validity definitions. It identified the range of behaviours that should be included in the questions in order to truly represent the theoretical concept that was being tested.

The downfall of the validity was in the checking of the questions with a panel. No panel was convened. Only a small pilot study of five untrained individuals was conducted in order to check the order and wording of the questions. Small wording changes were made based on their feedback.

7.5.1.3 Predictive criterion validity

Rubin and Babbie (2009:85) provides the most complex definition by stating that predictive criterion validity is the degree to which an instrument relates to an external criterion that is believed to be another indicator or measure of the same variable that the instrument intends to measure. Saunders *et al.* (2012:668) simplifies it to being a statistical test's ability to make accurate predictions. Goodwin (2010:132) marries the two thoughts by asserting that a measure needs to be able to forecast some future behaviour and it needs to relate to some other measure of behaviour. McBurney and White (2010:131) describe it in the same way as Goodwin while providing an example in the form of intelligence testing. A valid intelligence test would correlate highly with other intelligence tests and it would be able to predict the future performance such as whether someone would graduate from college.

Based on the above definitions there seem to be two principles of predictive criterion validity. The first is that the measurement has to relate to other measurements of the same construct. The Exercise Consistency Questionnaire, which measured Dynamic Inconsistency, should correlate to another Dynamic Inconsistency measuring tool. As this survey was created due to no other similar measure being available the study did not meet the first criteria of predictive criterion validity.

It did however meet the second principle that relates to being predictive in nature. According to Bowling (2004:12), this type of validity can be measured by looking at its discriminative ability explained by the following example. If there is a hypothetical sound reason to claim that people in lower economic groups are more likely to report poor health status, then the health status of the two groupings (higher and lower income groups) can be compared as a check of predictive validity. Two opposing groups could therefore be compared if a logical reason could be found for why they would differ.

This thinking was applied to the Exercise Consistency Questionnaire. Exercising less than 11 times a month was already an indication of Dynamic Inconsistency being present. The hypothesis was subsequently that those who exercised less would have a higher Dynamic Inconsistency score. Those who then exercised 12 times or more would have a lower Dynamic Inconsistency score. This hypothesis proved to be correct as was seen in section 6.2.2, as the less frequent group had an average Dynamic Inconsistency of 9.5 with the highest score being 27, compared to the more frequent group's average of 5.7 and the highest score being 14. However, with both the frequent and infrequent group indicating a small negative correlation with Dynamic Inconsistency (see section 6.2.2) the reality is the measure is weak.

The Exercise Consistency Questionnaire subsequently had a weak degree of predictive criterion validity. It should consequently be strengthened before utilising it again.

7.5.1.4 Construct validity

A variety of definitions were found for construct validity. Saunders *et al.* (2012:668) state that this type of validity determines the extent to which the measurement questions measure the presence of the intended constructs. Babbie (2011:161) on the other hand describe it as being the degree to which a measure relates to other variables as expected within a system of theoretical relationships. McBurney and White (2010:175) provide a different perspective explaining it as being the extent to which the results support the theory behind the research.

All of these definitions were quite vague about what construct validity really entails. Leedy and Ormrod (2013:90) alternatively provided a clearer understanding that was particularly relevant to Phase One. They proposed that construct Validity was the extent to which an instrument measures a characteristic that cannot be directly observed, yet is assumed to exist based on patterns in people's behaviour (such characteristic is called a construct). The authors continue with a couple of examples such as motivation, creativity and racial prejudice, which are all constructs as none of them can be directly observed and measured. They further assert that when developing instruments to assess an underlying construct, some kind of evidence that their approach does in fact measure the construct in question should be obtained.

This type of validity is particularly relevant to Phase One due to Dynamic Inconsistency being an impulsivity construct. It is a characteristic that cannot be directly observed, yet is assumed to exist based on the low gym visits (less than 11 times a month) behaviour pattern. The assumption was that these individuals would have a very high Dynamic Inconsistency score, as they would make more Dynamic Inconsistent decisions than those who exercised more frequently. This assumption was proven to be correct with the highest score being 27 for those who exercise less frequently compared to 14 for those who exercised more frequently. However the small negative correlation factor is again a concern. There is subsequently evidence that the Exercise Consistency Questionnaire did measure Dynamic Inconsistency to some degree.

It must be noted that this is the most difficult validity type to test and is often determined after years of experience by numerous researchers (Litwin, 1995:43). To therefore say this measurement tool measures Dynamic Inconsistency to some degree without question is

incorrect. There is a small amount of evidence to indicate that the questionnaire did measure Dynamic Inconsistency, but further studies would need to be conducted with a more robust tool before this statement can be made unequivocally.

7.5.2 Phase Two's measurement validity: structured observations

Because Phase Two was pre-planned, potential observer bias was reduced or even removed (Lancaster, 2005:100). Observer bias occurs when the subjective views of the researcher impacts the behaviour selected, as well as its interpretation, resulting in invalid data (Sapsford & Jupp, 2006:87). Pre-planning subsequently helps to increase the reliability of the data (Lancaster, 2005:100).

It also allows the collection of data in their natural setting at the time they occur, which helps to eliminate any subjective '*second hand*' accounts of phenomena from participants. Lastly it should also deliver highly reliable results, because it can easily be replicated. The easier the observation instrument is to use and understand, the more reliable the results will be (Saunders *et al.*, 2012:359).

However it can also be restrictive due to the very structured pre-planning process that can result in important data being missed (Lancaster, 2005:100). Research results are also limited to evident behaviour or superficial signals from which the observer must draw conclusions (Saunders *et al.*, 2012:359). This was particularly the case in Phase Two.

The main issues within this context however were the potential informant error and time error that could have crept in and affect the data's validity and reliability. Informant error will occur when the situation being observed is not a true reflection of the usually way of doing things because of factors out of the participants control (Saunders *et al.*, 2012:359). An example in a gym context could be that various work colleagues were sick, resulting in the observed gym member not visiting the gym due to their massive workload. As the study ran for 3 months the impact of this type scenario is very real. It could have been minimised if the research time frame was increased.

Time error was another issue of great concern, as it relates to ensuring that the time at which you conduct an observation is typical to the time period you are interested. The data will otherwise not be relevant (Saunders *et al.*, 2012:359).

Winter versus summer for instance has a definite effect on gym visits. As mentioned earlier people go to gym less in winter than in any other season (Shephard & Aoyagi, 2009:251). To conduct the study in autumn and winter consequently provided extra validity to the results. The fact that the interventions had a small effect on gym behaviour in such tough conditions is a feat in its own right.

7.6 ECOLOGICAL VALIDITY

The majority of definitions agree that ecological validity relates to doing research within a real life situation with real life impact (Goodwin, 2010:564; McBurney & White, 2010:177; Nestor & Schutt, 2011:197). Carter (2009:16) takes it one step further by stating that it focuses on implementing procedures on individuals who are already present in an environment, as appose to introducing researchers or others who are not already involved in a setting. Saunders *et al.* (2012:670) are the only ones who have a completely different view claiming that it is when findings can be generalised from one group to another.

Two principles come to the fore from these definitions, with both being particular relevant to Phase Two. Firstly ecological validity is present when the study is done in a real-life setting using a real existing population. This was the case in Phase Two. The second principle is the generalisability of the findings to other groups. Sending positive framed messages to all their low to no exercising members could potentially get them to exercise more often or get them to start exercising. The negative frame message could potentially get those who are already exercising to exercise more. As a result ecological validity was present when conducting Phase Two.

7.7 UNDERSTANDING RELIABILITY

In its simplest form reliability refers to consistency (Nestor & Schutt, 2011:9). Saunders *et al.*, (2012:192) provides a more detailed definition by stating that reliability indicates

whether the data collection techniques and analytic measures chosen would produce consistent findings if they were repeated on another occasion or if they were replicated by another researcher. Goodwin (2010:569) concurs with this sentiment by stating that it is the extent to which measures of the same phenomenon are consistent and repeatable. The author takes it one step further by also mentioning that if a measure is high in reliability it will contain a minimum of measurement error.

Reliability is subsequently about ensuring that the measurement tools used will deliver the same results over and over again regardless of who administers it. This is essential as without it there is no way of determining what a score on a particular measure means (Goodwin, 2010:130). For this reason the development of the Exercise Consistency Questionnaire and Structured Observation design had to take reliability into consideration.

7.8 ENSURING THE EXERCISE CONSISTENCY QUESTIONNAIRE WAS RELIABLE

When taking reliability into consideration within a questionnaire context, the biggest concern is its robustness and whether the questionnaire will deliver consistent findings at different times and different conditions (Saunders *et al.*, 2012:430). Brace (2013:192) echoes this sentiment by stating that a survey is reliable when it provides a consistent spread of responses from the same test every time. Reliability is clearly about ensuring the measure used delivers consistent results time and time again. Even though this can only be tested after the questionnaire has been administered it should be taken into consideration when developing the questionnaire (Saunders *et al.*, 2012:430).

Various tests are available to test a questionnaire's reliability. Knowles (2001:60) highlights five easy ways to check for reliability: comparison, multiple score reliability, retests reliability, alternate form reliability and split half reliability. McBride (2013:202) feels that the two most important tests are test-retest reliability, internal consistency of scores and split-half reliability. Saunders *et al.* (2012:430) on the other hand highlights test-retest, internal consistency and alternative form as the most important measures for consistency. After assessing all the measures it was decided that test–retest, internal consistency (which is tested with the split half reliability method) and alternative form would be considered.

7.8.1 Test re-test

According to Knowles (2001:60) this is one of the most obvious methods to determine reliability as it repeats the identical questionnaire a second time with the same individuals. If the scores are similar the questionnaires is reliable. McBride (2013:202) concurs with this provides guidance on how to do it. When a new questionnaire is designed a group of participants should take the questionnaires once. The same respondents would then take the questionnaires two months later. If the scores were similar between the first and second taking the survey would be reliable. This could however be quite problematic as it can be very difficult to persuade respondents to answer the same questionnaire twice (Saunders *et al.*, 2012:430).

As the health club partner had ownership of the database, it was impossible to get the same respondents to participate twice. They were very protective over their members and wanted to avoid survey or text fatigue, which could set in very quickly. Test-retest was subsequently not done in the study at hand.

7.8.2 Alternative form

This type of reliability tries to address some of the issues that the test-retest reliability measures has. Respondents can easily provide the same answers when they retake the same test because they remember what they answered. In order to counter this, one can implement the alternative form where two close to identical tests are developed. Both survey's correlations would subsequently be identical to each other (Knowles, 2001:60; Saunders *et al.*, 2012:430).

The same problem as was mention in the test-retest method came to the fore. This test for reliability was therefore also not an option.

7.8.3 Internal consistency

Internal consistency indicates the similarity of scores on the different items of a survey when compared to one another (McBride, 2013:202). Simply stated, it is the extent to which all items in a single instrument yield similar results (Leedy & Ormrod, 2013:91). This can be examined by correlating the question responses in a questionnaire with each other (Saunders *et al.*, 2012:430). This can be done through a method called split-half reliability (McBride (2013:202).

A single questionnaire's answers are split into two halves such as odd and even numbers. The two halves are scored separately and then compared. The closer the score results the higher the reliability of the measure (Knowles, 2001:61).

Three split half tests were done on three separate questionnaires in the way explained by Knowles. The even numbers for the first questionnaire was four while the uneven numbers was one. The second questionnaire's even numbers was six and uneven four. The third had a nine for the even numbers and a five for the uneven. The reliability of the questionnaire is subsequently not as high as one would have hoped, due to there not being pure consistency between the even or uneven comparative scores. However it is not non-existing either, as the even numbers were four, six and nine, while the uneven numbers were one, four and five. They are not the same, but not too far apart from each other either. These findings provide further substantiation for the predictive criterion and construct validity results in section 7.5.1.

In summary: very few tests could be done in order to check if the Exercise Consistency Questionnaire was in fact reliable. The only test that could be done was the internal consistency test with the help of the split-half reliability test. The results indicated some reliability, but probably not significant enough to use the measure again as is. The questionnaire consequently had some degree of reliability; however this would need to be bolstered if any further research was to be conducted with the same measure.

7.9 ENSURING THE STRUCTURED OBSERVATION DESIGN WAS RELIABLE

Calculations for reliability within an experimental research design are seldom done. It is rather confidence in the reliability of the measure that builds over time due to replication of

the same study (Goodwin, 2010:131). There is however factors that threaten a study's reliability and should be neutralised as much as possible. The following factors diminish a study's reliability and were countered by the study's design (Saunders *et al.*, 2012:192,361).

- a. *Participant error*: Any factor that could adversely alter the way in which a participant performs (Saunders *et al.*, 2012:192,361). This was a real concern as any external factor could influence the participants' behaviour to either visit the gym more often or less. Nothing could be done to counter it. However the base line period of the previous year did assist in identifying their particular pattern over the intervention period.
- b. *Participant bias*: Any factor that induces a false response (Saunders *et al.*, 2012:192,361). People could have changed their behaviour to visit the gym more often if they knew they were being observed. Nobody wants to look bad. This was subsequently the main reason why individuals who received the text messages in Phase Two didn't know they were being observed.
- c. *Researcher error*: Any factor that changes the researcher's interpretation i.e. not being sufficiently prepared, misunderstanding how to use the analysis instruments or just being tired (Saunders *et al.*, 2012:192,361). In order to avoid any misunderstanding of tools or instruments a statistician was consulted. Precautions were taken to ensure analysis of data was not misunderstood or done when fatigued; yet human error could unknowingly have crept in.
- d. *Researcher bias*: Any factor that induces bias in the researcher's recording of responses, which may skew the recording and interpreting of individual's response (Saunders *et al.*, 2012:192,361). This bias did not take place, as the data was objective in nature for both phases. Phase One's questionnaire was closed ended and filled in by the respondent. Phase Two's data was supplied by the health club partner who has an electronic database. The data was electronically captured every time someone swiped their membership card or not, thus they either exercised or they did not. The data obtained was therefore unbiased in nature.

7.10 RESEARCH ETHICS

Research ethics refers to the standards of behaviour that guides the conduct of a researcher in relation to the rights of those who became the subject or are affected by the study (Saunders *et al.*, 2012:226). Babbie (2013:63) agrees by stating that every social science researcher needs to be aware of the general agreement about what is proper and improper when conducting scientific research. All ethical issues should subsequently be recognised and considered in every research study (Saunders *et al.*, 2012:250). The following ethical elements were taken into consideration.

7.10.1 Protect from harm

The study aimed to develop a communication intervention, which would improve people's activity levels and ultimately their lives. The research was therefore beneficial in nature and did not harm the participants in any way (Babbie, 2013:65; Leedy & Ormrod, 2013:105).

7.10.2 Voluntary, informed participation

Leedy and Ormrod (2013:105) postulate that each participant needs to be properly informed of the nature of the study and must participate in the study voluntarily without any coercion. Individuals should be given the choice to participate, not to participate or to withdraw from the study at any time. Consent should therefore be provided in some way.

With Phase One being conducted via the Internet; permission was obtained by the email that was sent to all respondents (see Appendix B). A short description was given about the research and a link to the survey was at the bottom of the mail. People who subsequently clicked on it voluntarily participated.

There is another approach to consent in the form of "opting out". According to Vellinga, Cormican, Hanahoe, Bennett and Murphy (2011:40), active consent or opt-in has shown limited participation, resulting in biases. They continue by stating "*if consent is considered*

an indication of willingness rather than refusal and if risks for the participants are very low, an opt-out arrangement or passive consent is generally the most efficient procedure without violating the option of providing choice.”

Phase Two subsequently made use of this route by not asking for permission overtly, as it was assumed until indicated otherwise. Every sms had an opt-out function giving individuals the chance to eliminate their participation at any stage. A total of 25 respondents made use of the function and was thus excluded from the study.

7.10.3 Right to privacy

A participant's privacy needs to be protected at all costs. Data should therefore never be used in a way that will embarrass or identify the individual directly, except if the researcher got permission in writing (Babbie, 2013:69; Leedy & Ormrod, 2013:107). Privacy was a huge consideration in this study due to the partnership with health club partner, who had very strict privacy policies. The company's guidelines were therefore also adhered to in this study.

Participants' privacy was protected throughout Phase One and Two. Phase One's emails were sent out by the health club partner, as they were the custodians of the database. Something however had to be done from an identification point of view in order to ensure the right respondents made it into Phase Two. The health club partner subsequently assigned a unique number to each respondent. The researcher consequently only knew the respondents by their numbers and not by any other identifiable information.

7.10.4 Honesty of findings

Findings have been reported in a completely honest way, with no intentional misrepresentation or fabrication of data being done by the researcher. The researcher aimed to give credit where credit was due with regards to any idea or words taken from another source in order to avoid any form of plagiarism (Leedy & Ormrod:2013:108).

7.11 CONCLUSION

The aim of this chapter was to provide proof that every effort was made to ensure the methods and results of the study were valid, reliable and done in an ethical manner.

Validity was explained as the accuracy of the methods and findings. A host of validity types were available however only the most relevant were discussed. External validity focuses on the generalisability of a study's results (Saunders *et al.*, 2012:671). Numerous strategies were implemented to ensure that the study would be able to be replicated in other related settings. Internal validity deals with the extent to which the design can account for all the factors that may affect the outcome of the research results (Du Plooy, 2009:90). Various factors influence this type of validity, hence the reason why counter strategies were put in place.

Measurement validity is the degree to which a test or measuring instrument actually tests or measures what it claims to measure (Du Plooy, 2009:135). The Exercise Consistency Questionnaire proved to be the biggest challenge. It did however measure exercise Dynamic Inconsistency to some degree (face validity). It covered all types of scenarios that could result in a person making a Dynamic Inconsistent decision, though a panel was not convened to confirm its validity (content validity). In addition there was no strong evidence that the questionnaire could predict exercise related impulsivity, confirming low negative correlation scores achieved in 6.2.2. There was a slight indication, but no unequivocal proof.

Phase Two's structured observation approach was also scrutinised in order to ensure the method is valid. Various strategies were again put in place to counter any factors that might work against this type of validity. The only factor that did not have a counter strategy was other factors influencing the results. The solution was therefore to use the previous year's comparable time period as a base period for each gym member who made it into Phase 2. Future research should however aim to isolate these factors properly.

Ecological validity was the last type of validity and was present due to the study being conducted in a real-life setting using a real existing population. It was further substantiated based on the potential generalisation of the findings to other groups.

Reliability was the next main topic and ensures that the measurement tools used will deliver the same results over and over again regardless of the administrator. The Exercise Consistency Questionnaire was found to have some reliability, but not as much as one would have hoped telling a similar story to that of the measurement validity. This measurement would need some definite adjustments if any future research were to be conducted. Structured observation studies on the other hand do not have specific reliability measure formulas, as it is built over with the same study being replicated. However certain strategies were still implemented to assist with making it as reliable as possible.

Ethics was the last section and showed the steps taken to guide the researcher's conduct in maintaining every participant's rights, as well as the integrity of the study and its findings. All participants were protected from harm, as the study was beneficial in nature. Voluntary participation was overtly given in Phase One and passively in Phase Two. Protecting participants' privacy was of utmost. And findings were reported in an honest way as far humanly possible.

Even though the best efforts were made to ensure that the study was valid, reliable and ethical, improvements could have been made particularly with regards to the measurement tools. The next chapter will subsequently deal with the conclusions and recommendations of any future research.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

Chapter outline:

The purpose of this chapter is to:

- Recap the reason for the study
- Reiterate the research objectives
- Summarise the study's key findings related to the research objectives
- Discuss the implications of the findings for future behaviour change interventions
- Acknowledge the weaknesses of the study
- Provide recommendations for future research

8.1 INTRODUCTION

The last chapter aims to provide a holistic view of the study at hand. It will revisit the reasons why the study was important, as well as the key argument that resulted in the primary and secondary objectives. The findings for each of the objectives will be discussed, followed the numerous weaknesses of the study. These will be discussed in order to ensure that any future research can adapt to eliminate these limitations. The chapter will conclude with recommendations for future research based on the lessons learned over the course of the study.

8.2 IN SUMMARY: SEEING THE BIGGER PICTURE

There are various reasons why exercising is important and was discussed in Chapter One. Not only is it one of the major contributing factors to various chronic illnesses such as certain cancers, diabetes and heart disease (World Health Organisation, 2010:7,10), but it also results in 3.2 million deaths a year globally (Gaudin, 2013). Moreover it affects a country's economy negatively. South Africa already contributed 9% of its GDP to healthcare in 2010 (Andrew, 2012), which is in stark contrast to the World Health Organisation's recommendation of 5% (World Health Organisation, 2103b).

All of these effects can be countered by a mere two and a half hours of moderate intensity aerobic exercise a week, but due to lifestyle pastimes changes such as watching TV or playing videogames, this amount of exercise does not take place (Harvard School of Public Health Obesity Prevention, 2012; World Health Organisation, 2010:7,10). The study thus wanted to increase individuals' activity levels to at least two and a half hours a week.

The nature of the South African gym category though made this an almost impossible task. With more than two thirds of gym visitors visiting the gym monthly, yearly or less often (AMPS, 2012a), most would not be able to exercise the suggested amount to reap the health rewards, potentially resulting in chronic illness increases. Getting the overall gym population to visit the gym more often is subsequently of utmost importance.

Numerous interventions aimed at getting people to adopt healthier behaviours, such as exercising, have been tried with limited success (Dixon-Fyle *et al.*, 2010:63). Think about all the messages focused on the importance of healthy behaviour out there and yet people still continue to engage in risky behaviour e.g. smoking, eating unhealthy food and not exercising (Dixon-Fyle *et al.*, 2010:63). Decades of education still result in people exercising less and eating worse than they did 20 years ago (Chance, *et al.*, 2012:2).

Why is this? Because traditionally campaign planning and management within the communication discipline, focus on building attitudes, beliefs and opinions (Gordon, 2011). Health campaigns are thus geared towards creating persuasive communication with a motivation goal at the crux of the message (Gallagher & Updegraff, 2012:101). The behaviour of the individual subsequently does not change even though its attitude, belief or opinion in the form of creating a motivation might have.

A shift however has occurred, where the focus is now on how initial exercise motivation can be translated into sustained behavioural change (King & Sallis, 2009:287). The key enabler of this shift lies within the Behavioural Economics school of thought, as it identifies novel behavioural levers that do not rely on changing awareness or attitudes, but rather actual behaviour (Chance, *et al.*, 2012:2). It concentrates on understanding people's decision-making process in real life by integrating psychology with economic thinking (Boyd, 2010:3; Mullainathan & Thaler, 2000:1; Thorgeirsson & Kawachi, 2013:1). The

result is a new approach to communication campaigns that change actual behaviour (Dixon-Fyle *et al.*, 2010:65; Smith & Monge, 2011:33; Thorgeirsson & Kawachi, 2013:185; Zimmerman, 2009:289). Yet in order to use the right behavioural lever, one needs to understand how people really behave and make decisions.

Decision making with a Behavioural Economics lens was touched on in Chapter Two. The key concept that emerged however was the hot-cold dual system theory, which suggested that decisions are either made in a 'hot' (referred to as System 2), or 'cold' state (System 1). The 'hot' state is reflexive and impulsive, and results in emotional preferences, while the 'cold' state implements analytical preferences through slow, strategic thinking (Berns *et al.*, 2007:4; Samson & Voyer, 2012:57). Accordingly, when making decisions in the 'cold' state (System 1), the decision-maker is guided by forward-looking rational deliberations. Conversely, the 'hot' state (System 2) is driven by narrow-minded instinctive needs (Berns *et al.*, 2007:4). Impulsivity is subsequently at the forefront with System 2 or 'hot' state decisions, like self-control are to System 1 or 'cold' states.

This theory has a clear application to exercise as Bickel and Marsch (2001:83) postulates that a lack of exercise is one of the behaviours that involves some amount of impulsivity ('hot' state or System 2). The problem is therefore not the ability for planned behaviour (getting the gym contract, setting the alarm clock or packing a gym bag), but rather succumbing to impulsivity (not getting up to exercise when the alarm clock goes off, not stopping at the gym on the way home) (Hofmann, Friese & Strack, 2009:162). Evidently, the failure of self-control when faced with temptations can result in the decision to exercise taking a backseat (Baumeister & Tierney, 2011:2).

If a better understanding could therefore be gained about why people become impulsive and lose self-control in a 'hot' state, interventions could be developed that could assist in stopping it. Hence the reason why the two Behavioural Economics theories Delayed Discounting and Dynamic Inconsistency became the focal point of the research.

Chapter three explained that people would rather choose an instant, smaller reward, rather than the bigger later reward, which is Delayed Discounting in action (see section 3.2). Dynamic Inconsistency takes this one step further by stating that the initial decisions that

were made in a 'cold' state (making use of System 1) could be reversed once the future becomes the present (see section 3.4). A struggle subsequently ensues between a person's two different selves: the "Planner" and the "Doer". If the "Planner" wins, self-control prevailed, but if the "Doer" wins the temptation prevailed resulting in an individual making Dynamic Inconsistent decisions.

These two theories explain the majority of South African gym visitors' behaviour perfectly. Information about the dangers of an unhealthy lifestyle does not guarantee that someone will take the necessary preventive measures, because the benefits occur so far in the future that they seem of little value when compared to the immediate costs (Chapman & Elstein, 1995:373). Healthy choices in particular have shown that people often place a higher value on the present than the future, discounting both future costs and its benefits (Thorgeirsson & Kawachi, 2013:187). The reason for this is because individuals are not willing to give up immediate pleasurable activities (smoking, feasting or sunbathing) in favour of greater future rewards (e.g. less chance of cancer and diseases) (Daugherty & Brase, 2010:203). The "Doer" self clearly beats the "Planner" self, more often than not.

However, some individuals do realise the importance of healthy living, which includes exercise, and are motivated to act on it; the spike in gym subscriptions during January proves that (The New Age, 2013). They made the decision to act, got the contract and made plans to counter some of the temptations that might lead them astray from their original goal which is where Backward Induction and Decision Trees come in.

Yet, as time goes by, their attendance decline rapidly, as their commitment to their future goal diminishes. Intrapersonal conflict between the early ("Planner") and later ("Doer") selves' escalates (Angeletos *et al.*, 2003:522) with the "Doer" becoming the victor more and more. This type of behaviour is a clear indication of Dynamic Inconsistency (Goldhaber-Fiebert & Garber, 2011:4).

It could then be argued that people who make the impulsive decision not to visit the gym ('hot' state) even though they did set their alarm or planned to go to gym after work ('cold' state); discounted the effect it would have on their future health. It further indicates that the "Doer" defeated the "Planner". The individual reverse his or her preference by giving in to

the temptation of the immediate, smaller benefit (sleeping in or spending time with family) instead of staying the course as planned to reach the larger, future reward (better health). This assumption coincides with Smith and Monge (2011:32) who state that an exercise plan has a high probability of failure, because the immediate satisfaction is valued higher than future satisfaction. Dynamic Inconsistency is therefore a key element that needs to be addressed when aiming to persuade individuals to gym more often.

This is why the study was so important, as it investigated a new way of trying to influence those who don't visit the gym enough to reap the health rewards, while understanding all the intricacies discussed above. It aimed to change behaviour, as appose to just attitudes or perceptions. A host of Behavioural Economic tactics (Thorgeirsson & Kawachi, 2013:188) was at the researcher's disposal, however due to limited time, resources and system constraints the study focused purely on how Communication Framing could influence gym members' behaviour for the better.

Chapter four delved into the various types of frames available, but goal framing was ultimately best suited for the study at hand (see section 4.4.3). Reason being that goal framing focused on consequences either from a negative/loss or positive/gain perspective (Gamliel & Peer, 2010:12), which was executional compared to the other options.

This study, therefore, had ambitious ideals: use positive and negative goal-framed messages to assist the health club partner's infrequent gym members to choose the originally "I'm going to gym" decision, rather than yielding to irresistible instant reward of not visiting the gym.

8.2.1 Study's primary and secondary objectives

The following primary and secondary objectives was subsequently set for the study:

1. Identify whether Dynamic Inconsistency contributed to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month).

- a. Confirm that only those who visited the gym infrequently made Dynamic Inconsistent decisions.
 - b. Confirm that the frequent gym visitor did not make any Dynamic Inconsistent decisions.
2. Detect if negative goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.
- a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.
 - b. Establish if negative-goal framing messages were more effective in changing behaviour than the positive goal-framed messages.
3. Detect if positive goal-framed messages impact the gym behaviour of those who were found to ascribe to Dynamic Inconsistency.
- a. Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.
 - b. Establish if positive-goal framing messages were more effective in changing behaviour than the negative goal-framed messages.

8.3 ANSWERING THE RESEARCH OBJECTIVES

The following section will discuss the key findings that answered the primary and secondary research objectives.

8.3.1 Primary objective #1:

Identify whether Dynamic Inconsistency contributed to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month)

There was a slight indication that Dynamic Inconsistency did indeed contribute to the low gym attendance behaviour of the infrequent gym visitor (those who visited the gym 11 times or less a month). See section 6.2.

8.3.1.1 Secondary objective #1a:

Confirm that only those who visited the gym infrequently made Dynamic Inconsistent decisions

The premise at the start of the research was incorrect. Everyone made Dynamic Inconsistent decisions, whether a frequent or infrequent gym visitor. The difference however was that there was a small indication that the infrequent gym visitors do so more often compared to the frequent gym visitors.

8.3.1.2 Secondary objective #1b:

Confirm that the frequent gym visitor did not make any Dynamic Inconsistent decisions.

As stated in point 1.a, the premise of the research was incorrect, as all gym members within this study made Dynamic Inconsistent decisions. The inverse of point 1.a however was true for the frequent gym visitor: there was a slight indication that those who visit the gym more frequently made less Dynamic Inconsistent decisions compared to the infrequent visitors.

8.3.2 Primary objective #2:

Detect if negative goal-framed messages impacted the gym behaviour of those who were found to make Dynamic Inconsistent decisions.

The negative goal-framed messages did have a small impact on those who were found to make Dynamic Inconsistent gym decisions, however so did the positive goal-framed message. The assumption of the research from the onset was subsequently also incorrect, as it was not about having a better or worse effect, but rather what type of effect.

Note however that this intervention did not assist gym visitors to visit the gym more than 12 times a month.

8.3.2.1 Secondary objective #2a:

Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.

Numerous analyses techniques were used to ascertain if the gym behaviour changed when comparing the same time periods of 2013 and 2014 with limited success. The answer is thus yes and no. The inferential statistic ANOVA test indicated that there was no real statistical significant change and that the results were more coincidental than the actual intervention. Based on this test, the intervention did not work.

Yet when looking at the data on a more granular level with the help of descriptive statistics such as scatter plots and frequency distribution tables, behaviour changes were observed between 2013 and 2014. However, again not as was anticipated.

8.3.2.2 Secondary objective #2b:

Establish if negative-goal framing messages were more effective in changing behaviour than the positive goal-framed messages.

The negative goal framed messages impacted the higher exercise groups such as those who exercised above 10 times a month. They got frequent gym visitors to move up in the groups e.g. moving from '4 to 7' to '8 to 10' thus infrequent gym visitors of the health club partner exercised more.

It had the complete opposite effect on those who were less active e.g. visiting the gym zero to three times a month. It made them go less often. Negative goal-frame messages therefore had a positive impact on those who were close to being or actually were a frequent gym visitors, helping them to exercise more.

8.3.3 Primary objective #3:

Detect if positive goal-framed messages impact the gym behaviour of those who were found to ascribe to Dynamic Inconsistency.

The Positive goal-framed message did have a small impact on those who were found to make gym Dynamic Inconsistent decisions, as was mentioned in primary

objective 2. The same incorrect assumption was subsequently made from the start: each message type had a different function to perform rather than having an effect or not.

Note however that this intervention also did not assist gym visitors to visit the gym more than 12 times a month.

8.3.3.1 Secondary objective #3.a:

Ascertain if the behaviour changed when comparing the same time periods of 2013 and 2014.

The same answer as in secondary objective 2.a applies. From an inferential statistic point of view the intervention had no effect; it was rather just a coincidence. However the descriptive statistics provided useful insight to the granular changes that took place between 2013 and 2014.

8.3.3.2 Secondary objective #3.b:

Establish if positive-goal framing messages were more effective in changing behaviour than the negative goal-framed messages.

The positive goal-framed messages had a completely different effect to that of the negative goal-framed messages. It had a positive effect on the lower exercise groups, specifically the '1 to 3' class. This growth came from the best place: the zero exercise group. This means that the positive goal-framed messages moved people from inactivity to active! Note however that it did not have any real impact on the higher groups.

8.4 IMPLICATIONS OF THE FINDINGS

To pretend that a weekly sms over a three-month period during winter would have a massive impact on behaviour is to be naive. The reality is the effect was miniscule, as a real effect could not be detected until an in-depth analysis was done. The text messages subsequently had a minimal effect on gym behaviour.

To be excited about getting gym members who were inactive, active should not be celebrated too much, because as was stated through out the study, exercising less than 11 times a month is not enough to reap the specified health benefits. Thus even the positive goal-framed message did not assist in getting gym visitors to experience the true benefit of exercising. The only one that might have some potential in achieving this goal is the negative goal-framed message, as it moved those who exercised relatively frequently into a higher class.

That being said, there is an indication that further investigation is justified. Both positive and negative text messages had an effect, but just on different groups as was mentioned in the secondary findings. The negative goal-framed message had an effect on those who exercised more often. This implies that those who are moderately to highly active, could be motivated by a negatively framed sms to exercise more often.

The positively goal-framed message on the other hand had an effect on those who were inactive or exercising infrequently. This suggests that when lower exercise groups are exposed to positively frame messages, a change in behaviour could follow.

A case could thus be made for a combination study of positive and negative goal framed messages, as they would be targeting different groups making it more likely that the specific target could be reached. Nevertheless more research needs to be done in order to provide more proof of these findings. The results should thus be used with caution until solidified with additional research.

8.5 LIMITATIONS OF THE STUDY

A couple of weaknesses have to be acknowledged in the study at hand. The biggest limitation must be the newly developed Exercise Consistency Questionnaire. As it is brand new its validity and reliability is questionable. Strategies were put into place to try and bolster these two elements with some success, but the reality is that it was not what it should have been. The questionnaire would need to be relooked before it is used in any further study. In addition the questionnaire relied solely on people's memories, which are known to not be as accurate as they thought (Saunders *et al.*, 2012:177).

The fact that a proper pilot study was not conducted was another drawback of the study. A pilot study would have provided the necessary information to tweak the study where needed. It would also have given the researcher an indication of the reliability strength beforehand in order to address it.

Another major weakness is the fact that the interventions were only administered once a week in isolation. According to Fjeldsoe, Marshall and Miller (2009:170) successful text message interventions offered tailor-made messaging. Those who were not had a very high attrition rate. The authors continue that many were not used in isolation with support given by a website, face-to-face consultations or print material, but the reporting on these additional elements were poor. The point however is that one cannot expect massive behavioural change when relying on one sms a week. If a more holistic approach were taken such as incorporating other Behavioural Economic tools and if the time period were longer than just three months, a more concrete result would have been achieved.

8.6 RECOMMENDATIONS FOR FUTURE STUDIES

The main recommendation for future studies would be to ascertain whether the findings of this study were correct. A variety of studies have been done on message framing as discussed in Chapter 4, as well as section 1.3. The majority indicate that positive messaging is the better performing message pertaining to low health risk scenarios (Bartels, Kelly & Rothman, 2010:821). For the negative intervention to thus have some kind of effect is somewhat an anomaly and should be investigated further.

The second is to develop a true measure of Dynamic Inconsistency. If a proper adaptable measurement tool can be developed, which focus on the excuses, thoughts or feelings that stand in the way of people following through on their initial, better decision it could be applied to any kind of impulsive Dynamic Inconsistent related scenario. It would provide researchers with better insight into why people do what they do and provide direction on the type of strategies that could be implemented in order to ensure true behaviour change. This would subsequently be useful across a multitude of impulsive related Dynamic Inconsistent decisions which could range from serious decisions like taking antiretroviral

medication daily, to something as trivial as making that instant decision to take a long shower rather than a short one, wasting water in the process.

The descriptive statistics painted an interesting picture of the gym activities for this particular health club partner. No clear consistent trend was observed when comparing the 2013 base period to the 2014 intervention period. The same can be said for the scatter plots. This means people do not have a settled routine during the winter months, which correlates to Shephard and Aoyagi (2009:251) findings of people visiting the gym less in winter than in any other season. The question is are they totally refraining from exercise, or are they continuing their exercise regime at home, rather than facing the cold when going to gym? If so the health club partner could implement some kind of at-home training through ever advancing technology such as an app. Whether it would work or not would need to be tested in research.

If they refrain, how do one get them active, which was the main goal of this study. If a Behavioural Economics approach were again taken, how would people behave when tactics are combined? Numerous studies have been done under the commitment contracts umbrella (Goldhaber-Fiebert *et al.*, 2010, Thorgeirsson & Kawachi, 2013:188) but what if it is added in addition to the positive and negative communication goal framing? What if these messages are in real time as apposed to fixed to a specific day and time, which falls outside of the individual's routine? Research focused on a holistic approach should definitely be investigated.

Further inquiries need to be done to see if positive messages do indeed effect the lower exercise groups more, while the negative the upper exercise groups as define within the frequency distribution table. If it is true, health clubs should consider following a dual direct marketing approach, where those over a certain amount of gym visits move out of the positive and into the negative goal framing group.

Whether this type of mixed messaging would have the same effect on those who exercise more than 11 times a month is another route that could be explored. The assumption however is that it would reveal similar results: positively framed messages will be less effective, while negative text messages would motivate them to exercise more frequently.

The last route is taking a broader view on traditional communication. If the assumption were that Dynamic Inconsistent decisions could be avoided if the right message is communicated at the right time and place just before one would act on it, a mass media approach would not have the desired behavioural change effect. Should one then consider more one-on-one communication interventions as opposed to relying purely on mediums such as TV, outdoor or print?

All these potential routes should however consider all the lessons learnt from the study at hand and should make a concerted effort to avoid the pitfalls the researcher experienced.

8.7 IN CONCLUSION

Changing behaviour is not an easy task, as theory and actual behaviour is not an exact science, as Behavioural Economics' tried to explain. That being said, every effort should be made in all campaigns going forward, especially from a societal perspective, to change behaviour with communication as appose to just attitudes and opinions. Would this study have delivered different results if attitudes and opinions were the measure of success? Probably, but it clearly did not translate into behaviour change.

The biggest learning is thus that behavioural change interventions need to consider the context and different stages of an individual's developing need. The fact that the positive intervention seemed to have been more effective for lower exercise groups and the negative intervention more for the higher exercise groups just shows the importance of understanding where people are at.

Behavioural change studies should subsequently be more involved as they must be more bespoke and flexible. Meeting people within their situation with a message that resonates with their circumstances, within their routine, at a specific space and time that is relevant to THEM, will create an open minded individual who will take notice and even adapt their behaviour to the message conveyed.

9. LIST OF REFERENCES

Abegunde, D., Beaglehole, R., Durivage, S., Epping-Jordan, J., Mathers, C., Shengelia, B., Strong, K., Tukuitonga, C. and Unwin, N. 2005. *Preventing chronic diseases: a vital investment*. [Online] Available from: WHO Press: http://www.who.int/chp/chronic_disease_report/en/ [Downloaded: 2013-04-14].

Akl, E.A., Oxman, A.D., Herrin, J., Vist, G.E., Terrenato, I., Sperati, F., Costiniuk, C., Blank, D. and Schünemann, H. 2011. Framing of health information messages. *Cochrane Database of Systematic Reviews*, (12):1-83. [Online] Available from: Wiley Online Library: <http://0-onlinelibrary.wiley.com/doi/10.1002/14651858.CD006777.pub2/pdf> [Downloaded: 2013-05-26].

Alm, J. 2011. Testing behavioral public economics theories in the laboratory. *National Tax Journal*, 63(4): *National Tax Journal*, 63.4 (2010): 635-658. [Online] Available from Google Scholar: <http://0-econ.tulane.edu/innopac.up.ac.za/RePEc/pdf/tul1102.pdf> [Downloaded: 2013-03-05].

Altman, M. 2012. *Behavioral economics for dummies*. Kindle version. [e-book reader]. Available from: <http://www.amazon.co.uk> [Accessed: 2012-12-27].

AMPS. 2012a. *Individual: the frequency of gym attendance*. [Online] Available from: http://www.eighty20.co.za/xtract/xtabs.cgi?access_id=924054&xid=123016 [Accessed: 2013-06-22].

AMPS. 2012b. *Individual: who in the different LSM groups has accessed the internet in the last 7 days*. [Online] Available from Eighty Twenty: http://www.eighty20.co.za/xtract/xtabs.cgi?access_id=990733&xid=129203 [Accessed: 2013-07-28].

Andrew, M. 2012. Motsoaledi: South Africa's healthcare declining. *Mail and Guardian*. [Online] Available from: <http://mg.co.za/article/2012-09-07-motsoaledi-sa-health-care-declining> [Accessed: 2013-04-13].

Angeletos, G.M., Laibson, D., Repetto A., Tobacan, J. and Weinberg, S. 2003. The hyperbolic assumption model: calibration, simulation and empirical evaluation. In: Loewenstein, G. and Baumeister, D.R.R.F. (ed) *Time and decision: economics and psychological perspective of intertemporal choice*. Russell Sage Foundation: USA. [Online] Available from Google Books: https://books.google.co.za/books?id=tAOGAwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2013-06-13].

Anon. 2011. *The Economist Schumpeter Blog*. [Online] Available from: <http://www.economist.com/node/21531407> [Accessed: 2013-04-13].

Attema, A.E., Bleichrodt, H., Rohde, K.I.M. and Wakker, P.P. 2010. Time-tradeoff sequences for analyzing discounting and time inconsistency. *Management Science*, 56(11):2015–2030. [Online] Available from Google Scholar: <http://people.few.eur.nl/wakker/pdfspubld/10.1ttosequence.pdf> [Downloaded: 2013-08-10].

Babbie, E.R. 2008. *The basics of social research*. Fourth ed. Belmont: Thomson Wadsworth. [Online] Available from Google Books: <http://books.google.co.za/books?id=wYgWAAAAQBAJ&pg=PR23&dq=The+basics+of+social+research&hl=en&sa=X&ei=A5M>

QVLz8POLH7AaMmoDAAQ&ved=0CCgQ6AEwAA#v=onepage&q=The%20basics%20of%20social%20research&f=false [Accessed: 2014-08-03].

Babbie, E. 2011. *The basics of social research*. Fifth ed. Belmont: Thomson Wadsworth. [Online] Available from Google Books: <http://books.google.co.za/books?id=5TkFAAAAQBAJ&printsec=frontcover#v=onepage&q&f=false> [Accessed: 2014-08-03].

Babbie, E.R. 2013. *The basics of social research*. Sixth ed. Belmont: Thomson Wadsworth. [Online] Available from Google Books: http://books.google.co.za/books?id=&pg=PR22&dq=The+basics+of+social+research&hl=en&sa=X&ei=h24TVJ-qE8TwOq_pgLgP&ved=0CB0Q6AEwAA#v=onepage&q=population&f=false [Accessed: 2014-08-03].

Baran, S. and Davis, D. 2008. *Mass communication theory: foundation's, ferment and future*. Boston: Wadsworth. [Online] Available from Google Books: https://books.google.co.za/books?id=5TAebeoDnJ4C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-14].

Barken, R. and Busemeyer, J.R. 1999. Changing plans: dynamic inconsistency and the effect of experience on the reference point. *Psychonomic Bulletin & Review*, 6(4): 547-554. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/article/10.3758/BF03212962> [Downloaded: 2013-05-27].

Barken, R. and Busemeyer, J.R. 2003. Modelling dynamic inconsistency with a change of reference point. *Journal of behavioural decision making*, 16:235-255. [Online] Available from Wiley LibraryL <http://onlinelibrary.wiley.com/doi/10.1002/bdm.444/abstract> [Downloaded: 2013-05-27].

Baron, J. 1993. *Morality and rationality*. Springer Science +Business Media Dordrecht. [Online]. Available from Google books: https://books.google.co.za/books?id=aH-hBQAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-10].

Baros, R.C., de Carvalho, A.C.P.L.F. and Freitas A.A. 2015 . *Automatic design of decision-tree induction algorithms*. Springer: New York. Available from Google Books: https://books.google.co.za/books?id=PFqEBgAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed:2015-06-13].

Bartels, R.D., Kelly, K.M. and Rothman, A.J. 2010. Moving beyond the function of the health behaviour: The effect of message frame on behavioural decision-making. *Psychology and Health*, 25(10):September-821–838. [Online] Available from EBSCO: <http://0-web.ebscohost.com.innopac.up.ac.za/ehost/pdfviewer/pdfviewer?sid=40a966ae-14ed-44da-b68b-df4c79ddd327%40sessionmgr114&vid=29&hid=124> [Downloaded: 2013-05-27].

Bauera, S., de Niet, J., Timman, R. and Kordya, H. 2010. Enhancement of care through self-monitoring and tailored feedback via text messaging and their use in the treatment of childhood overweight. *Patient Education and Counselling*, 79(3):315–319. [Online] Available from Science Direct: <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0738399110001655> [Download: 2013-05-27].

Baumeister, R.F and Tierney, J. 2011. *Willpower: rediscovering the greatest human strenght*. New York: Penguin Books. [Online] Available from Google Books: <http://books.google.co.za/books?id=HpJ1bH3RLAsC&printsec=frontcover&dq=Willpower:+rediscovering+the+greatest+human+strength.&hl=en&sa=X&ei=HE0PVOXGC4av7AaEIIIC>

oDQ&ved=0CCAQ6AEwAA#v=onepage&q=Willpower%3A%20rediscovering%20the%20greatest%20human%20strength.&f=false. [Accessed: 2013-05-27].

Beatty, J.E., Beatty, J.S.A. and Dean, K.L. 2009. Exploring the connections between teaching philosophies, educational philosophies, and philosophy. *Journal of Management Education*, 33(1):99-114. [Online] Available from Sage Journals: <http://0-jme.sagepub.com.innopac.up.ac.za/content/33/1/99.short> [Downloaded: 2013-06-17].

Berg, N. and Gigerenzer, G. 2010. As-if behavioral economics: Neoclassical economics in disguise? *History of Economic Ideas*, 18(1):January-133-166. [Online] Available from Google Scholar: http://0-papers.ssrn.com.innopac.up.ac.za/sol3/papers.cfm?abstract_id=1677168&download=yes [Downloaded: 2013-05-18].

Berns, G.S., Laibson, D. and Loewenstein, G. 2007. Intertemporal choice – toward an integrative framework. *Trends in Cognitive Sciences*, 11(11):482-488. [Online] Available from Google Scholar: <http://nrs.harvard.edu/urn-3:HUL.InstRepos:4554332> [Downloaded: 2013-04-03].

Bertrand, M., Mullainathan, S. and Shafir, E. 2006. Behavioral economics and marketing in aid of decision making among the poor. *Journal of Public Policy & Marketing*, 25(1):8-23. [Online] Available from: JSTOR: <http://0-www.jstor.org.innopac.up.ac.za/stable/30000522> [Downloaded: 2013-05-19].

Bickle, W.K., Odum, A.L. and Madden, G.J. Impulsivity and cigarette smoking: delayed discounting in current, never and ex-smokers. *Psychopharmacology*, 146:447-454. [Online] Available from: Springer Link <http://0-link.springer.com.innopac.up.ac.za/article/10.1007/PL00005490#page-1> [Downloaded: 2014-07-04].

Bickel, W.K. and Marsch, L.A. 2001. Toward a behavioral economic understanding of drug dependence: delay discounting processes. *Addiction*, 96(1):2013-06-25-73–86. [Online] Available from Wiley Online Library: <http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1046/j1360-0443.2001.961736.x/pdf>. [Downloaded: 2013-06-25].

Black, K. 2011. *Business statistics: for contemporary decision makers*. Seventh edition. Unites States of America: Wiley & Son Inc. [Online] Available from Google Books: <http://books.google.co.za/books?id=fdQQwEcC6bYC&printsec=frontcover#v=onepage&qf=false> [Accessed: 2014-08-03].

Black, Hashimzade, N., Myles, G.D. and Myles G. 2012. *A dictionary of economics*. Oxford University Press: Oxford. [Online] Accessed from Google Books: https://books.google.co.za/books?id=uizhi22qekQC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-13].

Bowling, A. 2004. *Measuring health: a review of quality of life measurement scales*. Third ed. Berkshire: McGrwa-Hill [Online] Available from Google Books: <http://books.google.co.za/books?id=Mj0CHg0glMgC&printsec=frontcover&dq=Bowling+2004&hl=en&sa=X&ei=I-bIU6oN0KHsBsXlfgfN&ved=0CDwQ6AEwAw#v=onepage&q=Bowling%202004&f=false> [Accessed: 2014-08-04].

Boyd, D. 2010. *How to influence behaviour, not just attitudes*. Yellow Paper Series ed. Vancouver: DDB World Wide. [Online] Available from: <http://issuu.com/ddbparis/docs/howtoinfluencebehaviour> [Downloaded: 2013-08-10].

Brace, !. 2013. *Questionnaire design: how to plan, structure and write survey material for effective market research*. Great Britain: Kogan Page Publishers. [Online] Available from:

<http://books.google.co.za/books?id=-chT3Ki3GZAC&printsec=frontcover&dq=Questionnaire+design:+how+to+plan,+structure+and+write+survey+material+for+effective+market+research&hl=en&sa=X&ei=ehQMVNm7F5HH7AbIpIH4Bg&ved=0CDgQ6AEwAA#v=onepage&q=reliability&f=false> [Accessed: 2014-09-07].

Bradburn, N.M., Sudman, S. and Wansink, B. 2004. *Asking questions*. San Francisco: John Wiley & Sons. [Online] Available from Google Books: <http://books.google.co.za/books?id=YXKbTx2j9i4C&printsec=frontcover&dq=Asking+questions&hl=en&sa=X&ei=jZcQVLG1B9Of7AblyIH4Aw&ved=0CCgQ6AEwAA#v=onepage&q=Asking%20questions&f=false> [Accessed: 2013-08-10].

Brocas, I. 2011. Dynamic inconsistency and choice. *Theory and Decision*, 71(3):343–364. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/content/pdf/10.1007%2Fs11238-009-9183-x.pdf> [Downloaded: 2013-08-10].

Bulik, B.S. 2010. *Behavioral economics helping marketers better understand consumers*. [Online] Available from: <http://adage.com/article/cmo-strategy/behavioral-economics-helping-marketers-understand-consumers/145091/> [Accessed: 2013-04-03].

Busemeyer, J.R., Wang, Z. and Shiffrin, R.M. 2012. *Bayesian model comparison of quantum versus traditional models of decision making explaining violations of the dynamic consistency principle*. Available from: <http://0-excen.gsu.edu.innopac.up.ac.za/fur2012/fullpapers/jbusemeyer.pdf> [Accessed: 2015-06-08].

Byrne, J. and Humble, A.M. 2007. *An introduction to mixed method research*. [Online] Available from: <http://www.msvu.ca/site/media/msvu/MixedMethodologyHandout.pdf> [Accessed: 2015-07-05].

Camchong, J., McDonald, A.W., Nelson, B., Bell, C., Mueller, B.A., Specker, S. and Lim, K.O. 2011. Frontal hyperconnectivity related to discounting and reversal learning in cocaine subjects. *Biological Psychiatry*, 69(11):1117-1123. Available from Science Direct: <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0006322311000291> [Downloaded: 201-07-04].

Cargan, L. 2007. *Doing social research*. Maryland: Rowman & Littlefield Publisher. [Online] Available from Google Books: http://books.google.co.za/books?id=Ar2ZFrwYNVsC&printsec=frontcover&dq=Doing+social+research&hl=en&sa=X&ei=r5EQVJH_DpP07Ab7s4CYDw&ved=0CB0Q6AEwAA#v=onepage&q=Doing%20social%20research&f=false [Accessed: 201-07-04].

Carter, S.L. 2009. *The social validity manual: a guide to subjective evaluation of behaviour interventions*. London: Elsevier Inc. [Online] Available from Google Books: http://books.google.co.za/books?id=Hp2JYgY_mYC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2014-08-09].

Caspersen, C.J., Powell, K.E. and Christenson, G.M. 1985. Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Reports*, 100(2):126–131. [Online] Available from National Center for Biotechnology Information: <http://0www.ncbi.nlm.nih.gov.innopac.up.ac.za/pmc/articles/PMC1424733/pdf/pubhealthrep00100-0016.pdf> [Downloaded: 2013-07-27].

Chance, Z., Dhar, R., Frederick, S., Kichlu, R., Ratelis, E. and Waters, J. 2012. *Influencing health choices at work: change the environment, change behaviour*. [Online] Available from: <http://www.optumhealth.com/~media/OptumHealth/Podcast/Pdfs/Publications/02-28-13-ORC-yale-optum-WP.pdf> [Downloaded: 2013-04-27].

Chapman, G.B. and Elstein, A.S. 1995. Temporal discounting of health and money. *Medical Decision Making*, 15(4):373-386. [Online] Available from Google Scholar: <http://0-umg.umdj.edu.innopac.up.ac.za/smdm/pdf/15-04-373.pdf> [Downloaded: 2013-07-31].

Cherryholmes, C.H. 1992. Notes on pragmatism and scientific realism. *Educational Researcher*, 21(6):13-17. [Online] Available from JSTOR: <http://0-www.jstor.org.innopac.up.ac.za/stable/1176502.pdf> [Downloaded: 2013-06-19].

Cole-Lewis, H. and Kershaw, T. 2010. Text messaging as a tool for behavior change in disease prevention and management. *Epidemiologic Reviews*, 32(1):56-69. [Online] Available from: Google Scholar <http://0-epirev.oxfordjournals.org.innopac.up.ac.za/content/32/1/56.short> [Downloaded: 2013-06-11].

Cornelissen, J.P. and Werner, M.D. 2014. Putting framing in perspective: a review of framing and frame analyses across the management and organisational literature. [Online] Available: Taylor Francis Online <http://0-www.tandfonline.com.innopac.up.ac.za/doi/pdf/10.1080/19416520.2014.875669> [Downloaded: 2014-10-28].

Cram101 textbook reviews. 2012. *E-study guide for foundations of modern marcoeconomics, textbook by Ben J. Heijdra*. [Online] Available from Google Books: https://books.google.co.za/books?id=3Mmok5IO_kIC&pg=PT146&dq=many+selves+and+dynamic+inconsistency&hl=en&sa=X&ved=0CCwQ6AEwA2oVChMI0em-z9yMxgIViCvbCh39tQCY#v=onepage&q=many%20selves%20and%20dynamic%20inconsistency&f=false [Accessed: 2015-06-13].

Cram101 textbook reviews. 2013. *E-Study guide for the basics of social research textbook by Ear R. Babbie*. [Online] Available from Google Books: <http://books.google.co.za>

/books?id=yi10zPjg14oC&printsec=frontcover&dq=basics+of+social+research&hl=en&sa=X&ei=e_rdU56qEY3H7AbfqYHABw&ved=0CFsQ6AEwCA#v=onepage&q=validity&f=false [Accessed: 2014-08-03].

Cresswel, J.W. 2003. *Research design: qualitative, quantitative and mixed methods approaches*. Second ed. Thousand Oaks: Sage Publications. [Online] Available from: Havard http://isites.harvard.edu/fs/docs/icb.topic1334586.files/2003_Creswell_A%20Framework%20for%20Design.pdf [Accessed: 2015-07-05].

Creswell, J. W., Plano Clark, V. L., Gutmann, M. L., & Hanson, W. E. 2003. Advanced mixed methods research designs. In A. Tashakkori & C. Teddlie (eds.), *Handbook of mixed methods in social and behavioral research*. Thousand Oaks: Sage Publications. [Online] Available from: http://www.corwin.com/upm-data/19291_Chapter_7.pdf. [Accessed: 2015-07-05].

Daugherty, J.R. and Brase, G.L. 2010. Taking time to be healthy: Predicting health behaviors with delay discounting and time perspective. *Personality and Individual Differences*, 48(2):202-207. [Online] Available from Science Direct: <http://www.sciencedirect.com/science/article/pii/S0191886909004188> [Downloaded: 2013-03-23].

Davis, D.F., Golicic, S.L. and Boerstler, C.N. 2011. Benefits and challenges of conducting multiple methods research in marketing. *Journal of the Academy of Marketing Science*, 39(3):467–479. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/content/pdf/10.1007%2Fs11747-010-0204-7.pdf> [Download: 2013-06-22].

DeForge, R. and Shaw, J. 2012. Back- and fore-grounding ontology: exploring the linkages between critical realism, pragmatism, and methodologies in health & rehabilitation

sciences. *Nursing Inquiry*, 19(1):83–95. [Online] Available from Wiley Online Library: <http://0-onlinelibrary.wiley.com/innopac.up.ac.za/doi/10.1111/j.1440-1800.2011.00550.x/pdf> [Download: 2013-06-17].

Dekel, E., Lipman, B.L. and Rustichini, A. 2009. Temptation-driven preferences. *Review of Economic Studies*, 76(3):937-971. [Online] Available from Oxford Journals: <http://0-restud.oxfordjournals.org/innopac.up.ac.za/content/76/3/937.full.pdf+html> [Downloaded: 2013-05-25].

Denscombe, M. 2003. *The good research guide*. Second ed. Berkshire: McGraw Hill. [Online] Available from Google Books: http://books.google.co.za/books?id=tr7_kKxh08IC&printsec=fontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2014-08-03].

Denton Jr., R.E. 2012. *The George W. Bush presidency: a rhetorical perspective*. Lexington Books: Plymouth. [Online] Available from Google Books: https://books.google.co.za/books?id=4TUnxx8xAu8C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-14].

de Wit, H., Flory, J.D., Acheson, M.C., McCloskey, M. and Manuck, S.B. 2007. IQ and nonplanning impulsivity are independently associated with delay discounting in middle aged adults. *Personality and Individual Differences*, 42(1):111–121. Available from Science Direct: <http://0www.sciencedirect.com/innopac.up.ac.za/science/article/pii/S019188690600256X> [Downloaded: 2013-05-25].

Dholakia, U.M. 2000. Temptation and resistance: an integrated model of consumption impulse formation and enactment. *Psychology & Marketing*, 17(11):955-982. [Online] - 165

Available from Wiley Online Library: [http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1002/15206793\(200011\)17:11%3C955::AID-MAR3%3E3.0.CO;2-J/abstract](http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1002/15206793(200011)17:11%3C955::AID-MAR3%3E3.0.CO;2-J/abstract)
[Downloaded: 2013-03-15].

Diekhof, E.K., Nerenberg, L., Falkai, P., Dechent, P., Baudewig, J. and Gruber, O. 2012. Impulsive personality and the ability to resist immediate reward: an fMRI study examining inter-individual differences in the neural mechanisms underlying self-control. *Human Brain Mapping*, 33(12):2768–2784. [Online] Available from Wiley Online Library: <http://onlinelibrary.wiley.com/doi/10.1002/hbm.21398/abstract;jsessionid=A547AA691C3C75913F2816C6F91DDB7C.d04t02?deniedAccessCustomisedMessage=&userIsAuthenticated=false> [Downloaded: 2013-03-15].

Dixon-Fyle, S. and Kowallik, T. 2010. Engaging consumers to manage health care demand. *McKinsey Quarterly*, January. [Online] Available from: McKinsey Quarterly: http://www.mckinseyquarterly.com/Engaging_consumers_to_manage_health_care_demand_2507 [Accessed: 2013-04-13].

Doyle, L., Brady, A. and Byrne, G. 2009. An overview of mixed methods research. *Journal of Research in Nursing*, 14(2):175-185. [Online] Available from Sage Journals: <http://0-jrn.sagepub.com.innopac.up.ac.za/content/14/2/175.full.pdf+html> [Downloaded: 2013-06-08].

Draft FCB. 2011. *About the institute of decision making*. [Online] Available from: http://www.instituteofdecisionmaking.com/?page_id=2 [Accessed: 2013-04-03].

Drouin, J.P., Hediger, V., Henke, N., Kanzler, L., Leydon, E.F. and De Santis, P. 2008. The health care century. *Health International*, 76-17. [Online] Available from: McKinsey:

http://www.mckinseyit/storage/first/uploadfile/attach/140180/file/hi08_1hccentury_final.pdf
[Downloaded: 2013-04-13].

Du Plooy, G.M. 2009. *Communication research: techniques, methods and applications*. 2nd ed. Cape Town: Juta and Company Ltd. [Online] Available from Google Scholar: http://books.google.co.za/books?id=XmFvXyZJyQkC&pg=PA1&dq=Communication+research:+techniques,+methods+and+applications.&hl=en&sa=X&ei=uowQVM_pDqmv7AbJ7YCIBA&ved=0CC8Q6AEwAA#v=onepage&q=Communication%20research%3A%20techniques%2C%20methods%20and%20applications.&f=false [Accessed: 2013-04-13].

Elliot, C.S. and Hayward, D.M. 1998. The expanding definition of framing and its particular impact on economic experimentation. *The journal of socio-economics*, 27(2):229-243. [Online] Available from: Science Direct <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S1053535799800869#> [Downloaded: 2014-10-28].

El-Massah, S. 2013. The power of reframing incentives Field experiment on (students') productivity. *Advances in Management & Applied Economics*, 3(2):25-65. [Online] Available from Proquest: <http://0-search.proquest.com.innopac.up.ac.za/docview/1312298244/13D3EF8764C5C91CCE4/27?accountid=14717> [Downloaded: 2013-05-04].

Epstein, L.H., Salvy, S.J., Carr, K.C., Dearing, K.K. and Bickel, W.K. 14 July 2010. Food reinforcement, delay discounting and obesity. *Physiology & Behavior*, 100(5): 438-445. [Online] Available from Science Direct: <http://www.sciencedirect.com/science/article/pii/S0031938410001873#> [Downloaded: 2013-03-18].

Evans, J.S.B.T. and Stanovich, K.E. 2013. Dual-process theories of higher cognition: advancing the debate. *Perspectives on Psychological Science*, 8(3):223–241. [Online]

Available from SageJournals: <http://0pps.sagepub.com.innopac.up.ac.za/content/8/3/223.full.pdf+html> [Downloaded: 2013-05-19].

Feilzer, F.Y. 2009. Doing mixed methods research pragmatically: implications for the rediscovery of pragmatism as a research paradigm. *Journal of Mixed Methods Research*, October 1-11. Available from Sage Journals: <http://0-mmr.sagepub.com.innopac.up.ac.za/content/early/2009/10/22/1558689809349691.full.pdf+html> [Downloaded: 2013-06-08].

Field, M., Santarcangelo, M., Sumnall, H., Goudie, A. and Cole, J. 2006. Delay discounting and the behavioural economics of cigarette purchases in smokers: the effects of nicotine deprivation. *Psychopharmacology*, 186(2):255-263. [Online] Available from Springer Link: <http://link.springer.com/article/10.1007/s00213-006-0385-4> [Downloaded: 2013-03-18].

Fjeldsoe, B.S., Marshall, A.L., Miller, Y.D. 2009. Behaviour change interventions delivered by mobile telephone short-messaging service. *American Journal of Preventive Medicine*, 36(2):165 – 173. Available from Elsevier: <https://secure.jbs.elsevierhealth.com/action/getSharedSiteSession?redirect=http%3A%2F%2Fwww.ajpm-online.net%2Fretrieve%2Fpii%2FS0749379708008921&rc=0&code=amepre-site> [Downloaded: 2013-06-08].

Fink, A. 2003. *How to sample in surveys*. Second ed. London: Sage Publications. [Online] Available from Google Books: http://books.google.co.za/books?id=s_7GVySNWVgC&printsec=frontcover&dq=How+to+sample+in+surveys&hl=en&sa=X&ei=ZZMQVOLxHJCe7AbY-YGACQ&ved=0CEkQ6AEwBA#v=onepage&q=How%20to%20sample%20in%20surveys&f=false [Accessed: 2013-05-04].

Finkelstein, E.A. and Strombotne, K.L. 2010. The economics of obesity. *The American Journal of Clinical Nutrition*, 91:1520-1524. [Online] Available from: The American Journal
- 168

of Clinical Nutrition Online: <http://ajcn.nutrition.org/content/91/5/1520S.full.pdf+html>
[Downloaded: 2013-05-04].

Foxall, G.R., Doyle, J.R. and Yani-de-Soriano, M. 2011. Contexts and individual differences as influences on consumers' delay discounting. *The Psychological Record*, 61(4):599–612. [Online] Available from Google Scholar: <http://0opensiuc.lib.siu.edu.innopac.up.ac.za/tpr/vol61/iss4/6/> [Downloaded: 2013-05-25].

Frankish, K. 2010. Dual-process and dual-system theories of reasoning. *Philosophy Compass*, 5(10):914–926. [Online] Available from Wiley Online Library: <http://0onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1111/j.1747-9991.2010.00330.x/pdf>
[Downloaded: 2013-05-19].

Freeman, K.B., Green, L., Myerson, J. and Woolverton, W.L. 2009. Delay discounting of saccharin in rhesus monkeys. *Behavioural Processes*, 82(2):214-218. [Online] Available from Science Direct: <http://www.sciencedirect.com/science/article/pii/S0376635709001466> [Downloaded: 2013-04-18].

Gallagher, K.M. and Updegraff, J.A. 2012. Health message framing effects on attitudes, intentions, and behavior: a meta-analytic review. *The Society of Behavioral Medicine*, 43(1):101-116. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/article/10.1007/s12160-011-9308-7#page-1> [Downloaded: 2013-05-23].

Gamliel, E. and Herstein, R. 2012. Effects of message framing and involvement on price deal effectiveness. *European Journal of Marketing*, 46(9):1215-1232. Available from Emerald Insight: <http://0www.emeraldinsight.com.innopac.up.ac.za/journals.htm?articleid=17053720&show=abstract> [Downloaded: 2013-04-07].

Gamliel, E. and Peer, E. 2010. Attribute framing affects the perceived fairness of health care allocation principles. *Judgment and Decision Making*, 5(1):11–20. Available from Google Scholar: <http://www.decisionsciencenews.com/sjdm/journal.sjdm.org/10/91008/jdm91008.pdf> [Downloaded: 2013-05-26].

Gaudin, N. 2013. New physical activity guidance can help reduce risk of breast, colon cancers. [Online] Available from: http://0-www.who.int.innopac.up.ac.za/mediacentre/news/notes/2011/world_cancer_day_20110204/en/ [Accessed: 2013-07-27].

Giacobbi, P.R., Poczwardowski, A. and Hager, P.F. 2005. A pragmatic research philosophy for applied sport psychology. *Sport Psychologist*, 19(1):18-31. Available from Google Scholar: http://0-digitalcommons.brockport.edu.innopac.up.ac.za/pes_facpub/80/?utm_source=digitalcommons.brockport.edu%2Fpes_facpub%2F80&utm_medium=PDF&utm_campaign=PDFCoverPages [Downloaded: 2013-06-15].

Giatsi Clausen, M., Nicol, M. and Gill, J. 2010. The appeal of pragmatism for research employing a mixed methodology. In: Anonymous (ed.) *6th Mixed Methods International Conference*. University of Leeds, 7-11 July:1-2. [Online] Available from Google Scholar: http://0-eresearch.qmu.ac.uk.innopac.up.ac.za/1953/1/eResearch_1953.pdf [Downloaded: 2013-06-17].

Glöckner, A. and Witteman, C. 2010. Beyond dual-process models: a categorisation of processes underlying intuitive judgment and decision making. *Thinking & Reasoning*, 16(1):1-25. [Online] Available from Taylor Francis Online: <http://0dx.doi.org.innopac.up.ac.za/10.1080/13546780903395748> [Downloaded: 2013-03-31].

Goetz, T. 2011. *The decision tree: how to make better choices and take control of your*

health. New York: Rodale Inc. [Online] Available from Google Books: https://books.google.co.za/books?id=ydreAAAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-13].

Goldhaber-Fiebert, J.D., Garber, A.M. and Blumenkranz, E. 2010. Committed to exercise: contract design for virtuous habit forming. [Online] Available from Google Scholar: <http://www.nber.org/papers/w16624.pdf> [Accessed: 2013-05-18].

Goldhaber-Fiebert, J.D. and Garber, A.M. 2011. *The behavioural economics of exercise habits*. [Online] Available from Google Scholar: <http://www.voxeu.org/article/mind-games-behavioural-economics-exercise-habits> [Accessed: 2013-05-18].

Goodwin, C.J. 2010. *Research psychology methods and design*. Sixth ed. Hoboken: Wiley & Sons. [Online] Available from Google Books: <http://books.google.co.za/books?id=eNsVUGTMcDoC&printsec=frontcover#v=onepage&q&f=false> [Accessed: 2014-08-06].

Gordon, W. 2011. Behavioural economics and qualitative research - a marriage made in heaven? *International Journal of Market Research*, 53(2):1-12. [Online] Available from WARC: <http://www.warc.com/Content/ContentViewer.aspx?MasterContentRef=5d7ba33e-ddfb-42d9-85d2-0733f9ce104c&q=behavioural+economics> [Downloaded: 2013-05-08].

Gravetter, F.J. and Forzano, L.B. 2010. *Research methods for the behavioral sciences*. 4th ed. Belmont: Wadsworth. [Online] Available from Google Books: <http://books.google.co.za/books?id=pl04dzBpHy0C&printsec=frontcover&dq=Gravetter&hl=en&sa=X&ei=4JMQVJSAD43y7AaV5IDQAw&ved=0CB0Q6AEwAA#v=onepage&q=Gravetter&f=false> [Accessed: 2013-05-25].

Gray, D.E. 2009. *Doing research in the real world*. Second ed. London: Sage Publications. [Online] Available from Google Books: <http://books.google.co.za/books?id=QwZdBAAAQBAJ&pg=PA2&dq=Doing+research+in+the+real+world&hl=en&sa=X&ei=eJQQVP GyAfSB7QaCn4CABQ&ved=0CCMQ6AEwAQ#v=onepage&q=Doing%20research%20in%20the%20real%20world&f=false> [Accessed: 2013-05-25].

Green, L. and Myerson, J. 2004. A discounting framework for choice with delayed and probabilistic rewards. *Psychological Bulletin*, 130(5):769-792. [Online] Available from EBSCO: <http://0search.ebscohost.com.innopac.up.ac.za/login.aspx?direct=true&db=aph&AN=14421019&site=ehost-live&scope=site> [Downloaded: 2013-05-25].

Greer, R.D. 2002. *Designing teaching strategies: an applied behaviour analysis approach*. Academic Press: Florida. [Online] Available from Google Books: https://books.google.co.za/books?id=bugjKXDxQjYC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-13].

Hackenberg, T.D. 2013. From demand curves to public policy: introduction to the special issue on behavioural economics. *Journal Of The Experimental Analysis Of Behaviour*, 99:1-2. [Online] Available from Wiley Online Library: <http://0onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1002/jeab.8/full> [Downloaded: 2013-04-03].

Hanson, W.E., Creswell, J.W., Clark, V.L.P., Petska, K.S. and Creswell, J.D. 2005. Mixed methods research designs in counseling psychology. *Journal of Counselling Psychology*, 52(2):224–235. [Online] Available from Google Scholar: http://0-digitalcommons.unl.edu.innopac.up.ac.za/psychfacpub/373/?utm_source=digitalcommons.unl.edu%2Fpsychfacpub%2F373&utm_medium=PDF&utm_campaign=PDFCoverPages [Downloaded: 2013-06-18].

Harries, S. 2010. *Efficient brain seeks efficient brand*. [Online] Available from: <http://www.instituteofdecisionmaking.com/?p=61> [Accessed: 2013-04-23].

Hartlep, N.D. n/d. *Mixed methods research: an annotated bibliography*. [Online]. Available from: <http://www.unco.edu/AE-Extra/2010/1/hartlep.html> [Accessed: 2015-07-05].

Harvard School of Public Health Obesity Prevention. 2012. *Physical activity: exercise can help control weight*. [Online] Available from: <http://0-www.hsph.harvard.edu.innopac.up.ac.za/obesity-prevention-source/obesity-causes/physical-activity-and-obesity/#references> [Downloaded: 2013-07-27].

Hofmann, W., Friese, M. and Strack, F. 2009. Impulse and self-control from a dual-systems perspective. *Perspectives on Psychological Science*, 4(2):162. [Online] Available from SAGE Publications: <http://0-pps.sagepub.com.innopac.up.ac.za/content/4/2/162.short> [Downloaded: 2013-05-23].

Hofstee, E. (exactica@majesticinteractive.co.za) 2013. Vol. 9: Questionnaires (part one and two). [Email to:] Raubenheimer, C.E. (christelkunneke@gmail.com) 2013 – 07 – 16 and 30.

Hollingworth, C. 2013. Behavioural economics: how Obama's team nudged the voters. [Online] Available from: <http://www.thebearchitects.com/blog/2013/04/16/how-obamas-team-nudged-the-voters/> [Accesses:2013-07-16].

Jill, W. and John, R. 2011. Comparing responses from internet and paper-based collection methods in more complex stated preference environmental valuation surveys. *Economic Analysis and Policy*, 41(1): 83-97. [Online] Available from Informit: [- 173](http://0-</p></div><div data-bbox=)

search.informit.com.au.innopac.up.ac.za/documentSummary;dn=985983288247270;res=I
ELAPA [Downloaded: 2014-07-26].

Johnson, M.W. and Bickel, W.K. 2002. Within-subject comparison of real and hypothetical money rewards in delay discounting. *Journal of experimental analyses of behaviour*, 77(2):129-146. Available from Wiley Online Library: <http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1901/jeab.2002.77-129/abstract> [Downloaded: 2014-07-04].

Johnson, J.G. and Busemeyer, J.R. 2001. Multiple-stage decision-making: the effect of planning horizon length on dynamic consistency. *Theory and decision*, 51(2): 217-246. Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/article/10.1023/A:1015507110940#page-1> [Downloaded: 2015-06-08].

Johnson, M.W., Bickel, W.B., Baker, F., Moore, B.A., Badger, G.J., and Budney, A.J. 2010. Delay Discounting in Current and Former Marijuana-Dependent Individuals. *Experimental and Clinical Psychopharmacology*, 18(1):99-107. [Online] Available from National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2874198/> [Downloaded: 2013-04-14].

Johnson, R.B. and Onwuegbuzie, A.J. 2004. Mixed methods research: a research paradigm whose time has come. *Educational Researcher*, 33(7):14-26. [Online] Available from: Sage Journals <http://edr.sagepub.com/content/33/7/14.short?rss=1&ssource=mfr> [Downloaded: 2015-07-05].

Judd, C.M. and Kenny, D.A. 1981. *Estimating the effects of social interventions*. Cambridge: Cambridge University Press. [Online] Available from Google Books: http://books.google.co.za/books?hl=en&lr=&id=_k05AAAAIAAJ&oi=fnd&pg=PR9&dq=esti

mat+ing+the+effects+of+social+interventions&ots=KwLwuOslpH&sig=w0oc_6358OaxtXIWwM1ruVZB20#v=onepage&q=estimating%20the%20effects%20of%20social%20interventions&f=false [Accessed: 2014-08-03].

Just, D.R. and Payne, C.R. 2009. Obesity: Can Behavioral Economics Help? *The Society of Behavioral Medicine*, 38(1): 47–55. [Online] Available from Springer Link Online: <http://link.springer.com/article/10.1007/s12160-009-9119-2#> [Downloaded: 2013-03-08].

Kaufman - Scarborough, C. and Cohen, J. 2004. Unfolding consumer impulsivity: an existential phenomenological study of consumers with attention deficit Disorder. *Psychology & Marketing*, 21(8):637-669. [Online] Available from Wiley Online Library: <http://www.interscience.wiley.com/> [Downloaded: 2013-03-18].

Kelemen, M. and Rumens, N. 2008. *An introduction to critical management research*. London: SagePublications. [Online] Available from Google Books: <http://books.google.co.za/books?id=RXZoHd007kUC&printsec=frontcover&dq=An+introduction+to+critical+management+research&hl=en&sa=X&ei=YY8QVKrvCoiN7Qb5k4D4BA&ved=0CCgQ6AEwAA#v=onepage&q=An%20introduction%20to%20critical%20management%20research&f=false> [Downloaded: 2014-07-04].

Khalil, E.L. 2008. Adam Smith's concept of self-command as a solution to dynamic inconsistency and the commitment problem. *Economic Enquiry*, 48(1):178-191. [Online] Available from: Wiley Online Library <http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1111/j.1465-7295.2008.00182.x/pdf> [Downloaded: 2014-07-04].

Kim, B., Sung, Y.S. and McClure, S.M. 2012. The neural basis of cultural differences in delay discounting. *Philosophical Transactions of The Royal Society B*, 367(1589):650-656.

[Online] Available from: Royal Society Publishing: <http://rstb.royalsocietypublishing.org/content/367/1589/650.short> [Downloaded: 2013-04-14].

King, A.C. and Sallis, J.F. 2009. Why and how to improve physical activity promotion: Lessons from behavioral science and related fields. *Preventive Medicine*, 49(4): 286–288. [Online] Available from Science Direct: <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0091743509003363> [Downloaded: 2013-05-18].

Kirby, K.N. and Maraković, N.N. 1996 March. Delay-discounting probabilistic rewards: Rates decrease as amounts increase. *Psychonomic Bulletin & Review*, 3(1):100-104. [Online] Available from Springer Link: <http://0link.springer.com.innopac.up.ac.za/article/10.3758/BF03210748#> [Downloaded: 2013-04-14].

Kirby, K.N., Petry, N.M. and Bickel, W.K. 1999. Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology*, 128(1):78-87. [Online] Available from Google Scholar: <ftp://psyftp.mcmaster.ca/dalywilson/Papers/DawnPatrol/kirbyEtal1999.pdf> [Downloaded: 2013-04-14].

Kloppenber, J.T. 1996. An old name for some new ways of thinking? *The Journal of American History*, 83(1):100-138. [Online] Available from JSTOR: <http://0www.jstor.org.innopac.up.ac.za/discover/10.2307/2945476?uid=2&uid=4&sid=21102125098093> [Downloaded: 2013-06-17].

Knowles, C.R. 2001. *Prevention that works! A guide for developing school-based drug and violence prevention programs*. California: Corwin Press. [Online]. Available from Google Books: http://books.google.co.za/books?id=ta5X_KkchQYC&printsec=frontcover#v=onepage&q&f=false. [Accessed: 2014-09-07].

Kotzē, T. 2013 Theme 8: choosing an appropriate inquiry strategy for a study. *Study guide and course notes for Research Methodology 801*. Pretoria: Department of Marketing and Communication Management, University of Pretoria. [Online] Available from EBW 801 course web site: https://clickup.up.ac.za/webapps/portal/frameset.jsp?tab_group=courses&url=%2Fwebapps%2Fblackboard%2Fexecute%2FdisplayLearningUnit%3Fcourse_id%3D_69516_1%26content_id%3D_193802_1%26framesetWrapped%3Dtrue [Downloaded: 2013-06-02].

Lades, L.K. 2012. Impulsive consumption and reflexive thought: Nudging ethical consumer behavior. *Journal of Economic Psychology*, 1203:1-15. [Online] Available from Google Scholar: <http://www.econstor.eu/handle/10419/57569> [Downloaded: 2013-05-24].

Laibson, D. 1997. Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, 112(2):443-478. [Online] Available from JSTOR: <http://0-www.jstor.org.innopac.up.ac.za/stable/2951242> [Downloaded: 2013--08-03].

Lancaster, G. 2005. *Research Methods in Management*. Oxford: Elsevier Butterworth-Heinemann. [Online] Available from Google Books: <http://books.google.co.za/books?id=xR0YaMmYuhkC&printsec=frontcover&dq=Research+Methods+in+Management+lancaster&hl=en&sa=X&ei=WfIRVPuIHrDb7AbK0IGoCg&ved=0CCgQ6AEwAA#v=onepage&q=Research%20Methods%20in%20Management%20lancaster&f=false> [Accessed: 2014-09-11].

Latimer, A.E., Rench, T.A., Rivers, S.E., Katulak, N.A., Materese, S.A., Cadmus, L., Hicks, A., Hodorowski, J.K. and Salovey, P. 2008. Promoting participation in physical activity using framed messages: An application of prospect theory. *British Journal of Health Psychology*, 13(4):659–681. [Online] Available from Wiley Online Library: <http://0>

onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1348/135910707X246186/full
[Downloaded: 2013-05-27].

Leedy, P.D. and Ormrod, J.E. 2013. *Practical research: planning and design*. Tenth ed. New Jersey: Pearson Education Inc.

Levine, D.K. 2012. *Is behavioral economics doomed?* United Kingdom: Open Book Publishers. [Online] Available from Open Book Publishers: <http://www.openbookpublishers.com/product/77/is-behavioral-economics-doomed---the-ordinary-versus-the-extraordinary> [Downloaded: 2013-05-26].

Levin, I.P. and Gaeth, G.J. 1988. How consumers are affected by the framing of attribute information before and after consuming the product. *Journal of Consumer Research*, 15(3):374-378. [Online] Available from JSTOR: [Online] Available from: <http://0-www.jstor.org.innopac.up.ac.za/stable/2489471> [Downloaded: 2013-05-26].

Levin, I.P., Schneider, S.L. and Gaethc, G.J. 1998. All frames are not created equal: a typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes*, 76(2):149–188. [Online] Available from Science Direct: <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0749597898928047> [Downloaded: 2013-05-26].

Lind, D.A., Marchal, W.G. and Mason, R.D. 2002. *Statistical techniques in business and economics*. Eleventh edition. New York: McGraw-Hill Higher Education.

Littlejohn, S.W. and Foss, K.A. 2005. *Theories of human communication*. Eight edition. Belmont: Thomas Wadsworth.

Litwin, M.S. 1995. How to measure survey reliability and validity. USA: Sage Publications. [Online] Available from Google Books: <http://books.google.co.za/books?id=vEt-3bUjJOoC&q=How+to+measure+survey+reliability+and+validity&dq=How+to+measure+survey+reliability+and+validity&hl=en&sa=X&ei=hfgRVNmcHeXE7AaAhoHYBA&ved=0CB0Q6AEwAA> [Accessed: 2014-05-26].

Louie, K. & Glimcher, P.W. 2010. Separating Value from Choice: Delay Discounting Activity in the Lateral Intraparietal Area. *The Journal of Neuroscience*, 30(16):5498-5550. [Online] Available from: The Society for Neuroscience: <http://www.jneurosci.org/content/30/16/5498.short> [Downloaded: 2013-04-18].

Mackillop, J., Amlung, M.T., Wier, L.M., David, S.P. Ray, L.A., Bickel, W.K. and Sweet, L.H. 2012. The neuroeconomics of nicotine dependence: A preliminary functional magnetic resonance imaging study of delay discounting of monetary and cigarette rewards in smokers. *Psychiatry Research: Neuroimaging*, 202(1):20-29. [Online] Available from Science Direct: <http://www.sciencedirect.com/science/article/pii/S0925492711003477> [Downloaded: 2013-03-18].

Mackillop, J., Miranda, J.R. Jr., Monti, P.M., Ray, L.A., Murphy, J.G., Rohsenow, D.J., McGuey, J.E., Swift, R.M., Tidey, J.W. & Gwaltney, C.J. 2010. Alcohol demand, delayed reward discounting, and craving in relation to drinking and alcohol use disorders. *Journal of Abnormal Psychology*, 119(1):106-114. [Online] Available from National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2862264/> [Downloaded: 2013-03-18].

Magen, E. and Gross, J.J. 2010. Getting our act together: toward a general model of self-control. In: Hassin, R. & Ochsner, K. and Trope, Y. (eds.) *Self-control in society, mind, and brain*. Oxford: Oxford University Press. [Online] Available from Google Books: <http://books.google.co.za/books?id=2iFBgt8FR1MC&printsec=frontcover&dq=Self-control+in+society,+mind,+and+brain.&hl=en&sa=X&ei=vE0PVJyeFPPy7AbzvIC4AQ&ved=0CCgQ6AEwAA#v=onepage&q=Self-control%20in%20society%2C%20mind%2C%20and%20brain.&f=false> [Accessed: 2013-03-18].

Marteau, T. M., Ogilvie, D., Roland, M., Suhrcke, M. and Kelly, M. P. 2011. Judging nudging: can nudging improve population health? *BMJ*, 34229:263-266. [Online] Available from BMJ: <http://0-www.bmj.com.innopac.up.ac.za/content/342/bmj.d228.long> [Downloaded: 2013-03-18].

Martin, J. 2010. At the intersection of behavioural economics and philosophy: mutually informed disciplines. *South African Journal of Philosophy*, 29(2):95-104. [Online] Available from African Journals Online: <http://www.ajol.info/index.php/sajpem/article/view/57053> [Downloaded: 2013-03-18].

McBride, D.M. 2013. *The process of research in psychology*. Second edition. California: SAGE. [Online] Available from Google Books: <http://books.google.co.za/books?id=Os5JK-P6oloC&printsec=frontcover#v=onepage&q&f=false> [Accessed: 2014-09-07].

McBurney, D.H. and White, T.L. 2010. *Research methods*. Eighth edition. Belmont: Thomas Wadsworth. [Online] Available from Google Books: http://books.google.co.za/books?id=AUDoylSe_EC&pg=PA173&dq=types+of+validity&hl=en&sa=X&ei=M=rdU5CeJZGA7Qa7oIHwAw&ved=0CB8Q6AEwAQ#v=onepage&q=types%20of%20validity&f=false [Accessed: 2014-08-03].

Morse, J.M. 2003. Principles of mixed methods and multimethods research design. In: Tashakkori, A. and Teddlie, C. (eds.) *Handbook of mixed methods in social and behavioral research*. California: SAGE Publications. [Online] Available from Google Books: <http://books.google.co.za/books?id=v4wJF5hZhKgC&pg=PT368&dq=Handbook+of+mixed+methods+in+social+and+behavioral+research+morse&hl=en&sa=X&ei=DZEQVKaHCc2A7Qa0i4DACA&ved=0CB0Q6AEwAA#v=onepage&q=Handbook%20of%20mixed%20methods%20in%20social%20and%20behavioral%20research%20morse&f=false> [Accessed: 2014-02-01].

Mullainathan, S. and Thaler, R.H. 2000. Behavioral Economics. *NBER Working Paper Series*, 7948:1-13. [Online] Available from National Bureau of Economic Research: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2862264/> [Downloaded: 2013-04-22].

Neergaard, H. and Ulhoi, J.P. 2007. *Handbook of qualitative research methods in entrepreneurship*. United Kingdom: Edward Elgar Publishing. [Online] Available from Google Books: http://books.google.co.za/books?id=MRbX7pcPnUC&printsec=frontcover&dq=Handbook+of+qualitative+research+methods+in+entrepreneurship&hl=en&sa=X&ei=quvIU7y7A6bB7Aa3_IHYDQ&ved=0CBwQ6AEwAA#v=onepage&q=Handbook%20of%20qualitative%20research%20methods%20in%20entrepreneurship&f=false [Accessed: 2014-08-09].

Nestor, P.G. and Schutt, R.K. 2011. *Research methods in psychology: investigating human behaviour*. California: Sage Publications. [Online] Available from Google Books: http://books.google.co.za/books?id=N8CMOISloGgC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2014-08-09].

Nordgren, L.F. and Chou, E.Y. 2011. The push and pull of temptation: the bidirectional influence of temptation on self-control. *Psychological Science*, 22(11):1386-1390. [Online]

Available from SAGE Publications: <http://0pss.sagepub.com.innopac.up.ac.za/content/22/11/1386.full.pdf+html> [Downloaded: 2013-05-25].

O'Leary, Z. 2004. *The essential guide to doing research*. London: SAGE Publication. [Online] Available from Google Books: <http://books.google.co.za/books?id=ltKeqNfgNW0C&printsec=frontcover&dq=The+essential+guide+to+doing+research&hl=en&sa=X&ei=nJIQVK3FCqnD7AaYv4DABQ&ved=0CCgQ6AEwAA#v=onepage&q=The%20essential%20guide%20to%20doing%20research&f=false> [Accessed: 2013-05-25].

Ory, M.G., Jordan, P.J. and Bazzarre, T. 2002. The behavior change consortium: setting the stage for a new century of health behavior-change research. *Health Education Research*, 17(5):500–511. [Online] Available from Oxford Journals: <http://0-her.oxfordjournals.org.innopac.up.ac.za/content/17/5/500.full.pdf+html> [Downloaded: 2013-05-04].

Pansiria, J. 2006. Doing tourism research using the pragmatism paradigm: an empirical example. *Tourism and Hospitality Planning & Development*, 3(3):223-240. [Online] Available from Taylor Francis Online: <http://0-www.tandfonline.com.innopac.up.ac.za/doi/abs/10.1080/14790530601132401#.UcCUxPnfCSp> [Downloaded: 2013-06-17].

Patel, Y. (Yunus.Patel@partnerhealthclub.co.za) 2013. Discussion about potential free research for one of the leading health club chains in South Africa [Email to:] Raubenheimer, C.E. (christel.raubenheimer@ddb.co.za) 2013-08-23.

Petry. N.M. 2001. Delay discounting of money and alcohol in actively using alcoholics, currently abstinent alcoholics and controls. *Psychopharmacology*, 154:243-259. Available

from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/article/10.1007/s002130000638#page-1> [Downloaded: 2014-07-04].

Peat, J., Mellis, C. and Williams, K. 2002. *Health Science Research: A Handbook of Quantitative Methods*. Australia: Sage Publication. [Online] Available from Google Books: <http://books.google.co.za/books?id=xu-XsS4EIEUC&printsec=frontcover&dq=Health+Science+Research:+A+Handbook+of+Quantitative+Methods.&hl=en&sa=X&ei=qfARVNuONlqp7Aa-2YHoCQ&ved=0CCgQ6AEwAA> [Accessed: 2014-08-04].

Percy, L. and Rosenbaum-Elliott, R. 2012. *Strategic Advertising Management*. Fourth ed. Oxford:Oxford University Press. [Online] Available from: Google Scholar http://books.google.co.za/books?id=APuFBqYAXr0C&printsec=frontcover&dq=Strategic+Advertising+Management+Percy+%26+Rosenbaum-Elliott&hl=en&sa=X&ei=pkcPVJKfN8To7Ab_slGoDg&ved=0CCgQ6AEwAA#v=onepage&q=Strategic%20Advertising%20Management%20Percy%20%26%20Rosenbaum-Elliott&f=false [Accessed: 2014-08-04].

Peters J. and Büchel C. 2010. Episodic future thinking reduces reward delay discounting through an enhancement of prefrontal-mediocortical interactions. *Neuron*, 66(1):138-148. [Online] Available from: National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/pubmed/20399735> [Downloaded: 2013-03-18].

Pierce, Rod. 2014. Correlation, math is fun. [Online] Available from: <http://www.mathsisfun.com/data/correlation.html> [Accessed: 2014-09-14].

President's Council on Fitness, Sports and Nutrition. 2013. Facts and statistics: physical activity. [Online] Available from: <http://www.fitness.gov/resource-center/facts-and-statistics/#footnote-2> [Accessed: 2013-10-01].

Read, D. and Frederick, S. 2012. DRIFT: an analysis of outcome framing in intertemporal choice. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 39(2):573–588. [Online] Available from Google Scholar: <http://0psycnet.apa.org.innopac.up.ac.za/index.cfm?fa=buy.optionToBuy&id=2012-21160-001> [Downloaded: 2013-04-07].

Reyna, V.F. and Brainerd, C.J. 2011. Dual processes in decision making and developmental neuroscience: a fuzzy-trace model. *Developmental Review*, 31(2–3):180–206. [Online] Available from Science Direct: <http://0-www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0273229711000153> [Downloaded: 2013-05-19].

Riley, W.T. 2012. Leveraging Technology for Multiple Risk Factor Interventions Comment on “Multiple Behavior Changes in Diet and Activity”. *Archives of Internal Medicine*, 172(10):796–798. [Online] Available from: Google Scholar <http://0-archinte.jamanetwork.com.innopac.up.ac.za/article.aspx?articleid=1170040> [Downloaded: 2013-06-02].

Rohde, K.I.M. 2010. The hyperbolic factor: a measure of time inconsistency. *Journal of Risk and Uncertainty*, 41(2):125–140. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/content/pdf/10.1007%2Fs11166-010-9100-2.pdf> [Downloaded: 2013-08-18].

Rubin, A. and Babbie, E. 2009. *Essential research methods for social work*. Second ed. Belmont: Brooks and Cole. [Online] Available from Google Books: <http://books.google.co.za/books?id=cO8lh0omJtMC&pg=PA85&dq=criterion+validity&hl=en&sa=X&ei=ikfeU5HUBKKu7AaTI4C4DA&ved=0CCoQ6AEwAQ#v=onepage&q=criterion%20validity&f=false> [Accessed: 2014-08-03].

Rubinstein, A. 2006. Discussion of "behavioral economics". *Econometric Society Monographs*, 42:246. [Online] Available from Google Scholar: <http://citeseerx.ist.psu.edu/innopac.up.ac.za/viewdoc/download?doi=10.1.1.104.4353&rep=rep1&type=pdf> [Downloaded: 2013-05-17].

Samson, A. and Voyer, B.G. December 2012. Two minds, three ways: dual system and dual process models in consumer psychology. *AMS Review*, 2(2-4):48-71. [Online] Available from Springer Link: <http://link.springer.com/article/10.1007/s13162-012-0030-9> [Downloaded: 2013-03-08].

Sanders, K., Flache, A., van der Vegt, G. and van der Vliert, E. 2006. Employees' organisational solidarity within modern organisations: a framing perspective on the effects of social embeddedness. In Fetchenhauer, D., Flache, A., Buunk, A.P. and Lindenberg, S.M. (eds) *Solidarity and prosocial behaviour: an integration of sociological and psychological perspectives*. New York: Springer science +business media. [Online] Available from Google Books: https://books.google.co.za/books?id=-J2FtxiobXkC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false [Accessed: 2015-06-14].

Sapsford, R. and Jupp, J. 2006. *Data Collection and Analysis*. Second ed. London: SAGE.

Saunders, M., Lewis, P. and Thonhill, A. 2012. *Research methods for business students*. Sixth ed. England: Pearson. [Online] Available from Google Books: http://books.google.co.za/books?id=u-txtfaCFiEC&dq=.+Research+methods+for+business+students&hl=en&sa=X&ei=M_ERVOjWMarn7AbzioCoBg&ved=0CB0Q6AEwAA [Accessed: 2013-03-08].

Setlow, B., Mendez, I.A., Mitchell, M.R. and Simon, N.W. 2009. Effects of chronic administration of drugs of abuse on impulsive choice (delay discounting) in animal models. *Behavioural Pharmacology*, 20(5-6):380-389. [Online] Available from National Center for Biotechnology Information: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2874684/> [Downloaded: 2013-03-18].

Shah, H. and Dawney, E. 2005. *Behavioural economics: seven principles for policy-makers*. London: The New Economic Foundation.

Shephard R.J. and Aoyagi, Y. 2009. Seasonal variations in physical activity and implications for human health. *European Journal of Applied Physiology*, 107(3):251-271. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/article/10.1007/s00421-009-1127-1> [Downloaded: 2013-07-13].

Shevel, A. 2011. *Gym groups eye township market in growth drive*. [Online] Available from: <http://www.timeslive.co.za/business/article894306.ece/Gym-groups-eye-township-market-in-growth-drive> [Accessed: 2013-06-22].

Sim, J. and Wright, C. 2000. *Research in health care: concepts, designs and methods*. Cheltenham: Stanley Thomes. [Online] Available from Google Books: <http://books.google.co.za/books?id=vwjhgtUoNZIC&printsec=frontcover&dq=search+in+health+care:+concepts,+designs+and+methods.&hl=en&sa=X&ei=MJIQVICkK8Lm7AaUtYDgAg&ved=0CDYQ6AEwAA#v=onepage&q=search%20in%20health%20care%3A%20concepts%2C%20designs%20and%20methods.&f=false> [Accessed: 2013-03-08].

Simon, M. 2011. *Assumptions, Limitations and Delimitations*. [Online] Available from: <http://dissertationrecipes.com/wp-content/uploads/2011/04/AssumptionslimitationsdelimitationsX.pdf> [Accessed: 2014-09-11].

Simpson, C.A. and Vuchinich, R.E. 2000. Reliability of measure of temporal discounting. *The Psychological Record*, 50:3-16. [Online] Available from Google Scholar: http://0-opensiuclib.siu.edu.innopac.up.ac.za/cgi/viewcontent.cgi?article=1329&context=tpr&sei-redir=1&referer=http%3A%2F%2Fscholar.google.co.za%2Fscholar%3Fq%3DRELIABILITY%2BOF%2BA%2BMEASURE%2BOF%2BTEMPORAL%2BDISCOUNTING%26btnG%3D%26hl%3Den%26as_sdt%3D0%252C5%26as_vis%3D1#search=%22RELIABILITY%20MEASURE%20TEMPORAL%20DISCOUNTING%22 [Downloaded: 2013-03-08].

Singh, R. and Mangat, N.S. 1996. *Elements of survey sampling*. Netherlands: Kluwer Academic Publishers. [Online] Available from Google Books: <http://books.google.co.za/books?id=Ma3meAj5pt0C&printsec=frontcover&dq=Elements+of+survey+sampling&hl=en&sa=X&ei=5pUQVMTDC4XT7AbekIFw&ved=0CCgQ6AEwAA#v=onepage&q=Elements%20of%20survey%20sampling&f=false> [Accessed: 2013-03-08].

Smith, L.M. 2009. *Optimism, delay discounting and physical exercise: the role of delay discounting on individual levels of exercise*. Unpublished masters thesis. Texas: University of North Texas. [Online] Available from Google Scholar: http://digital.library.unt.edu/ark:/67531/metadc30512/m2/1/high_res_d/thesis.pdf [Accessed: 2013-03-08].

Smith, L. and Monge, L. 2011 July. Behavioural change and exercise: how to stop people from quitting. *Deakin Papers in International Business Economics*, 4(1):28-36. [Online] Available from Google Scholar: <http://0www.deakin.edu.au.innopac.up.ac.za/buslaw/dpibe/dpibe201107.pdf#page=29> [Downloaded: 2013-04-22].

Taatila, V. and Raij, K. 2012. Philosophical review of pragmatism as a basis for learning by developing pedagogy. *Educational Philosophy and Theory*, 44(8):831–844. [Online] Available from Wiley Online Library: <http://0-onlinelibrary.wiley.com.innopac.up.ac.za/doi/10.1111/j.1469-5812.2011.00758.x/pdf> [Downloaded: 2013-06-18].

Tang, TLP. and Sutarso, T. 2012. Falling or not falling into temptation? Multiple faces of temptation, monetary intelligence, and unethical intentions across gender. *Journal of Business Ethics*, September:1-24. [Online] Available from Springer Link: <http://0-link.springer.com.innopac.up.ac.za/content/pdf/10.1007%2Fs10551-012-1475-3.pdf> [Downloaded: 2013-05-25].

Teck H. Ho, T.H., Lim, N. and Camerer, C.F. August 2006. Modeling the psychology of consumer and firm behavior with Behavioral Economics. *Journal of Marketing Research*, 43(3):307-331. [Online] Available from JSTOR archive: <http://www.jstor.org/discover/10.2307/30162405?uid=3739368&uid=2&uid=4&sid=21101925146843> [Downloaded: 2013-03-08].

Thaler, R.H. and Sunstein, C.R. 2008. *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Kindle version. [e-book reader] Available from: <http://www.amazon.co.uk> [Accessed: 2012-12-27].

The New Age. 2013. *Reflections and promises*. [Online] Available from: <http://www.thenewage.co.za/mobi/Detail.aspx?NewsID=115195&CatID=12> [2014-02-08].

Thorgeirsson, T. and Kawachi, I. 2013. Behavioral Economics: merging psychology and economics for lifestyle Interventions. *American Journal of Preventive Medicine*, 44(2):185–189. [Online] Available from Science Direct: <http://0www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S074937971200757X> [Downloaded: 2013-04-22].

Tomer, J.F. 2007. What is behavioral economics? *The Journal of Socio-Economics*, 36(3):463–479. [Online] Available from Science Direct: <http://www.sciencedirect.com>. <http://www.innopac.up.ac.za/science/article/pii/S1053535706001156> [Downloaded: 2013-05-17].

Tsukayama, E., Duckworth, A. L., and Kim, B. 2012. 2012. Resisting everything except temptation: evidence and an explanation for domain-specific impulsivity. *European Journal of Personality*, 26(3):318-334. [Online] Available from Wiley Online Library: http://scholar.google.co.za/innopac.up.ac.za/scholar?q=Resisting+everything+except+temptation%3A+evidence+and+an+explanation+for+domainspecific+impulsivity.&btnG=&hl=en&as_sdt=0%2C5 [Downloaded: 2013-05-27].

Van't Riet, J., Ruiter, R.A.C., Werrij, M.Q. and de Vries, H. 2010. Investigating message-framing effects in the context of a tailored intervention promoting physical activity. *Health Education Research*, 25(2):343–354. [Online] Available from Oxford Journals: <http://her.oxfordjournals.org/innopac.up.ac.za/content/25/2/343.full.pdf+html> [Downloaded: 2013-05-27].

Vaughan, L. 2003: *Statistical methods for the information professional*. Canada: Thomas H. Hogan. [Online] Available from Google Books: <http://books.google.co.za/books?id=EEuYobEzHMC&printsec=frontcover#v=onepage&q&f=false> [Accessed: 2014-08-02].

Vellinga, A., Cormican, M., Hanahoe, B., Bennett, K. and Murphy, A.W. 2011. Opt-out as an acceptable method of obtaining consent in medical research: a short report. *Medical Research Methodology*, 11(1):40. [Online] Available from BMC: <http://www.biomedcentral.com/innopac.up.ac.za/1471-2288/11/40/#B3> [Downloaded: 2013-08-25].

Weber, R.A. and Camerer, C.F. 2006. “Behavioral experiments” in economics. *Experimental Economics*, 9(3):187-192. [Online] Available from Springer Link:

<http://link.springer.com/article/10.1007%2Fs10683-006-9121-5?LI=true#page-1>
[Accessed: 2013-04-06].

Williams, W.C. n.d. *William Carlos Williams quotes*. Available from: http://en.thinkexist.com/quotation/it_is_not_what_you_say_that_matters_but_the/341651.html [Accessed: 2014-09-12].

World Health Organisation. 2005. *Rethinking 'diseases of affluence': the economic impact of chronic diseases*. Facing The Facts #4 ed. [Online]. Available from: http://www.who.int/chp/chronic_disease_report/media/Factsheet4.pdf [Accessed: 2013-04-06].

World Health Organisation. 2010. *Global recommendations on physical activity for health*. [Online]. Available from: <http://www.who.int/dietphysicalactivity/publications/9789241599979/en/> [Accessed: 2013-04-06].

World Health Organisation. 2013a. *Chronic diseases*. [Online] Available from: http://www.who.int/topics/chronic_diseases/en/ [Accessed: 2013-04-14].

World Health Organisation. 2013b. *South Africa health statistics*. [Online] Available from: <http://www.who.int/countries/zaf/en/> [Accessed: 2013-04-13].

Zimmerman, F.J. 2009. Using behavioral economics to promote physical activity. *Preventive Medicine*, 49(4):289–291. [Online] Available from Science Direct: <http://0->

www.sciencedirect.com.innopac.up.ac.za/science/article/pii/S0091743509003417

[Downloaded: 2013-05-16].

APPENDICES

APPENDIX A - Exercise excuse themes -

The following clusters were used to inform the newly developed Exercise Consistency Questionnaire.

ILLNESS

1. Will you visit the gym today if: ***you are sick?***
 - YES
 - NO
2. Will you visit the gym today if: ***you have a cough?***
 - YES
 - NO
3. Will you visit the gym today if: ***you have a headache?***
 - YES
 - NO

HECTIC LIFE

1. Will you visit the gym today if: ***you went to bed late the previous night?***
 - YES
 - NO
2. Will you visit the gym today if: ***you know you will be driving in peak traffic?***
 - YES
 - NO
3. Will you visit the gym today if: ***you are tired?***
 - YES
 - NO
4. Will you visit the gym today if: ***you have to do grocery shopping?***
 - YES
 - NO
5. Will you visit the gym today if: ***you're under pressure at work?***
 - YES
 - NO

REWARD/ESCAPE

1. Will you visit the gym today if: ***your muscles are still sore from yesterday's exercise?***
 - YES
 - NO
2. Will you visit the gym today if: ***you went to gym yesterday?***
 - YES
 - NO
3. Will you visit the gym today if: ***a new TV series starts during your normal gym slot?***
 - YES
 - NO
4. Will you visit the gym today if: ***you've already done something unhealthy today i.e. eat fast food, chocolates or chips?***
 - YES
 - NO

WEATHER

1. Will you visit the gym today if: ***it rains?***
 - YES
 - NO
2. Will you visit the gym today if: ***there's a heat-wave?***
 - YES
 - NO
3. Will you visit the gym today if: ***it's cold?***
 - YES
 - NO

RELAX DAYS

1. Will you visit the gym today if: ***it's a Friday?***
 - YES
 - NO
2. Will you visit the gym today if: ***it's a weekend?***
 - YES

- NO
- 3. Will you visit the gym today if: ***it's a public holiday?***
 - YES
 - NO
- 4. Will you visit the gym today if: ***it's your annual holiday?***
 - YES
 - NO

GYM ROUTINE/EXPERIENCE

1. Will you visit the gym today if: ***you missed your usual gym time slot?***
 - YES
 - NO
2. Will you visit the gym today if: ***today's schedule only allows a gym visit when the gym is overcrowded?***
 - YES
 - NO
3. Will you visit the gym today if: ***you know you'll have to wait for exercise machines?***
 - YES
 - NO
4. Will you visit the gym today if: ***you know you'll be gyming with fit, muscular individuals?***
 - YES
 - NO
5. Will you visit the gym today if: ***you know you'll be gyming with overweight individuals?***
 - YES
 - NO
6. Will you visit the gym today if: ***you know you'll be gyming with individuals who look perfect after rigorous exercise?***
 - YES
 - NO

OCCASION/EVENT

1. Will you visit the gym today if: ***you have a special event or occasion planned for some time during the day?***
 - YES
 - NO

2. Will you visit the gym today: ***if you are going out for dinner, a movie, show or any similar event some time during the day?***
 - YES
 - NO

EMOTIONAL

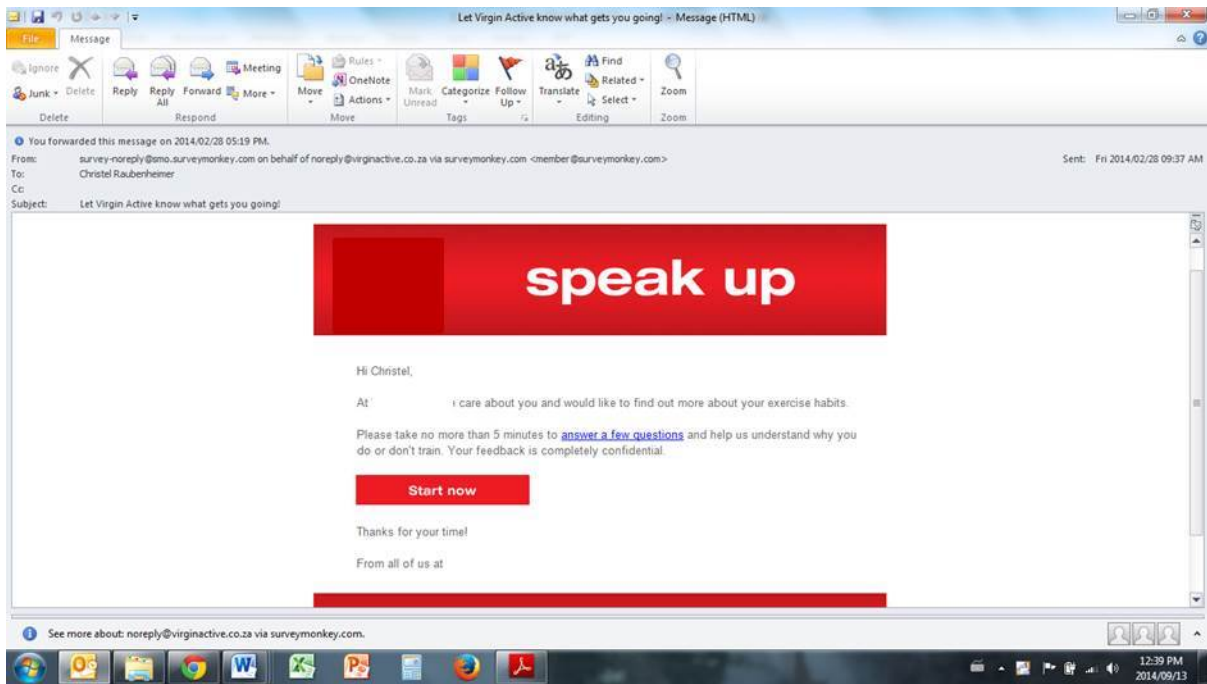
1. Will you visit the gym today if: ***you had a "bad day"?***
 - YES
 - NO

2. Will you visit the gym today if: ***you are angry?***
 - YES
 - NO

3. Will you visit the gym today if: ***you are sad?***
 - YES
 - NO

APPENDIX B
- Exercise Consistency Questionnaire email -

The email was used in Phase One and was sent to the 10 000 individuals in the sample.



APPENDIX C
- Exercise Consistency Questionnaire -

Those who responded to the email had to complete the following questionnaire which was based on the groupings identified in Appendix A.

HEALTH STATE

In order to ensure we don't waste your time, kindly indicate whether you are currently being treated for any of the following conditions

- ▶ Heart disease
- ▶ Stroke
- ▶ Cancer
- ▶ Chronic respiratory diseases i.e. asthma
- ▶ Diabetes

YES: link to end of the survey

NO: continue

QUESTION 1

Will you visit the gym today if: ***you went to gym yesterday?***

YES

NO

QUESTION 2

Will you visit the gym today if: ***you are tired?***

YES

NO

QUESTION 3

Will you visit the gym today if: ***you're under pressure at work?***

YES

NO

QUESTION 4

Will you visit the gym today if: ***you have a special event or occasion planned for some time during the day?***

YES

NO

QUESTION 5

Will you visit the gym today if: ***it rains?***

YES

NO

QUESTION 6

Will you visit the gym today if: ***you went to bed late the previous night?***

YES

NO

QUESTION 7

Will you visit the gym today if: ***you are angry?***

YES

NO

QUESTION 8

Will you visit the gym today if: ***you know you'll have to wait for exercise equipment?***

YES

NO

QUESTION 9

Will you visit the gym today if: ***you missed your usual gym time slot?***

YES

NO

QUESTION 10

Will you visit the gym today if: ***the only time you have to do grocery shopping is during your gym time?***

YES

NO

QUESTION 11

Will you visit the gym today if: ***you are sad?***

YES

NO

QUESTION 12

Will you visit the gym today if: ***there are extreme weather conditions?***

YES

NO

QUESTION 13

Will you visit the gym today if: ***you've already eaten something you consider unhealthy today?***

YES

NO

QUESTION 14

Will you visit the gym today if: ***you had a "bad day"?***

YES

NO

QUESTION 15

Will you visit the gym today if: ***it's a public holiday?***

YES

NO

QUESTION 16

Will you visit the gym today if: ***you have a cough?***

YES

NO

QUESTION 17

Will you visit the gym today if: ***if you are going out for dinner, a movie, show or any similar event some time during the day?***

YES

NO

QUESTION 18

Will you visit the gym today if: ***you know you will be driving in peak traffic on your way there and back (to gym)?***

YES

NO

QUESTION 19

Will you visit the gym today if: ***today's schedule only allows a gym visit when the gym is full?***

YES

NO

QUESTION 20

Will you visit the gym today if: ***you are sick?***

YES

NO

QUESTION 21

Will you visit the gym today if: ***a new TV series starts during your normal gym slot?***

YES

NO

QUESTION 22

Will you visit the gym today if: ***it's a Friday?***

YES

NO

QUESTION 23

Will you visit the gym today if: ***it's cold?***

YES

NO

QUESTION 24

Will you visit the gym today if: ***it's a weekend?***

YES

NO

QUESTION 25

Will you visit the gym today if: ***you have a headache?***

YES

NO

QUESTION 26

Will you visit the gym today if: ***your muscles are still sore from yesterday's exercise session?***

YES

NO

QUESTION 27

Will you visit the gym today if: ***it's your annual holiday?***

YES

NO

THANK YOU for your participation

APPENDIX D
- Frequency distribution graphs -

The following will discuss the frequency graphs for the intervention groups and their corresponding base period.

Positive Group's May frequency distribution

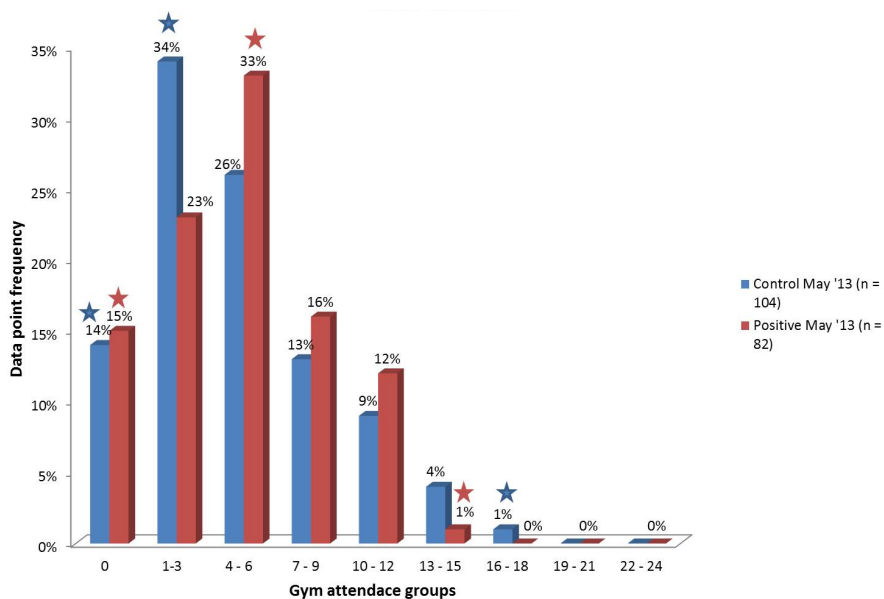
It is evident from figure 21 that the respective May 2013 Positive and Control groups' data clusters around different points. The Control's data centres on the one to three gym attendance group, while the Positive Group's is around the four to six group. This means

that the Positive Group has more people who exercise four to six times a month than any other gym attendance group. The Control Group on the other hand has more who exercise between one and three times a month compared to any other attendance group.

The largest gym visit band within the Positive Group was between 13 and 15, while the Control's was 16 to 18. This means that people went less often (only between 13 and 15 times a month) in the Positive Group compared to the Control Group's (between 16 and 18 times a month).

Both groups' smallest band was in the zero grouping. This means that its lowest point was people who did not exercise at all during the month of May.

Figure 23: Comparing the distribution frequencies of the May 2013 Positive Group to the distribution frequencies of May 2013 Control Group

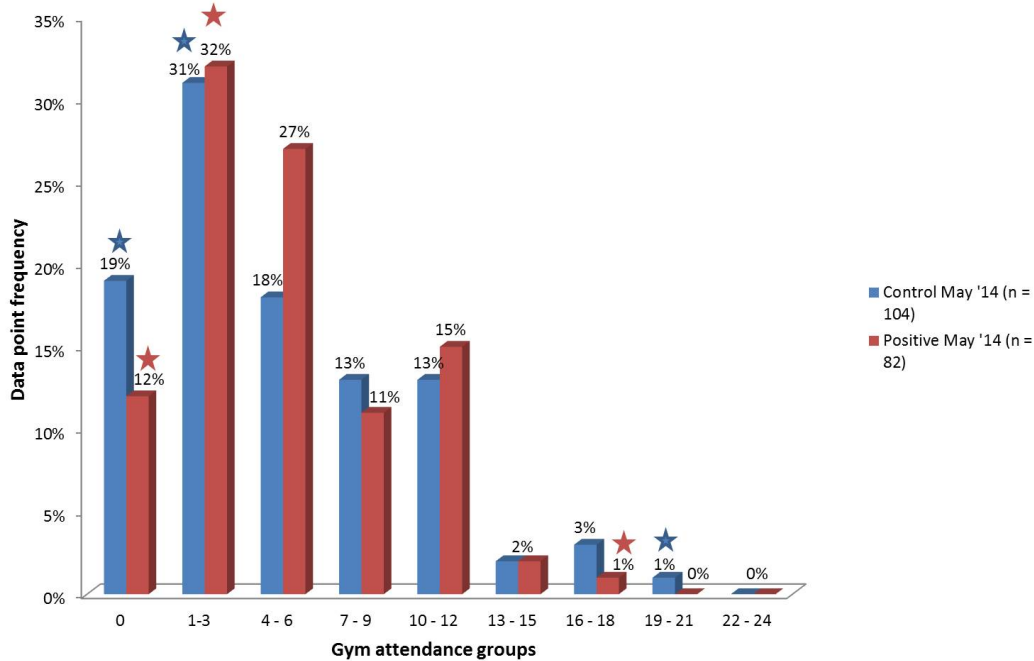


When comparing this to May 2014 (depicted in figure 22) a totally different picture emerges. The data clustered around the 1 to 3 grouping for both the Control and Positive Group. This means that most individuals went to gym between one and three times a month in both groups. This move is not ideal for the Positive Group as it means that the intervention assisted in making people less active when considering the Positive Group's peak was between 4 and 6.

Both groups still had a zero exercise grouping. The intervention group did not move its smallest data point and thus still had people who did not exercise at all.

The largest gym attendance band increased for both groups compared to the year before. The Control moved by two groupings between 19 and 21, while the Positive Group moved by only one to between 16 and 18. Both groups therefore had more people visiting the gym more often. A move was subsequently a natural phenomenon, however the fact that the Positive Group did not move to the same amount of classes is a bit of a concern as it then lagged behind a group which did not have any kind of intervention.

Figure 24: Comparing the distribution frequencies of the May 2014 Positive Group to the distribution frequencies of May 2014 Control Group



Shifts took place when taking a high level look at the more detailed data; however it seems like the intervention did not affect the major points. May still had its smallest point at zero; its cluster point shifted to a lower band while the Control stayed consistent and the largest exercise band moved, but not by as much as the Control.

Positive Group’s June frequency distribution

The data for June 2013 is portrayed in figure 23 below and clustered at the same place for both the Control and the Positive Group. This means that most individuals within the Control Group and Positive Group fell within the 1 to 3 gym attendance band. The largest data point is between 13 and 15 for the Control and 16 and 18 for the Positive Group. Both groups had their smallest point in the zero or inactive group.

A similar picture emerge when looking at June 2014 data (see figure 24). Both groups' clustered within the 1 to 3 band, both still had a zero smallest data point and both had a largest gym attendance band of 16 to 18. No real impact can again be seen from the intervention when looking at these three overarching elements.

Figure 25: Comparing the distribution frequencies of the June 2013 Positive Group to the distribution frequencies of June 2013 Control Group

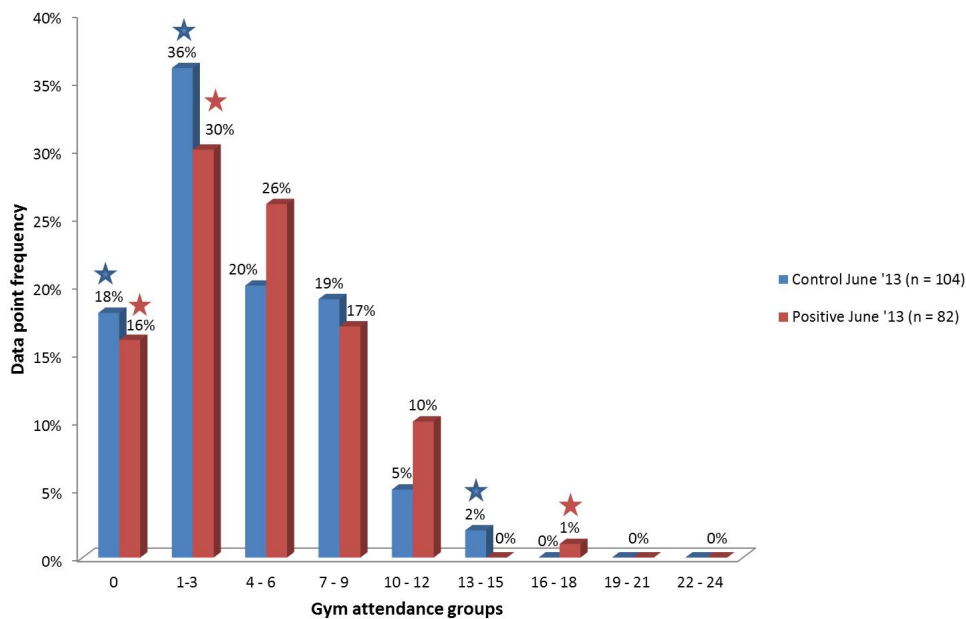
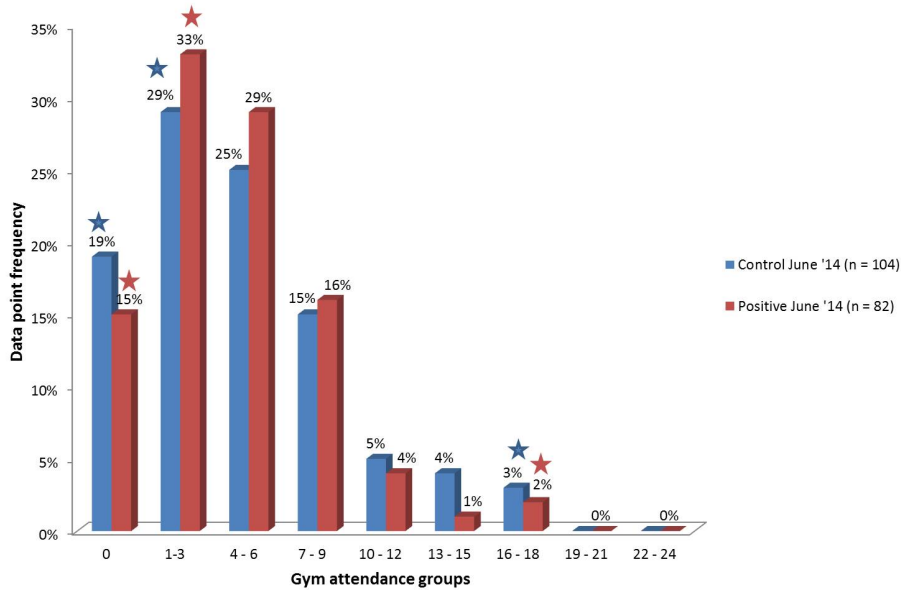


Figure 26: Comparing the distribution frequencies of the June 2014 Positive Group to the distribution frequencies of June 2014 Control Group



Positive Group’s July frequency distribution

July’s 2013 graph, depicted in figure 25, looks similar to the above. Both groups cluster point is within the 1 to 3 group. Both largest points are in the 16 to 18 class. Both has a smallest point of zero. When comparing this to June 2014 (figure 26) the exact same picture emerges.

Figure 27: Comparing the distribution frequencies of the July 2013 Positive Group to the distribution frequencies of July 2013 Control Group

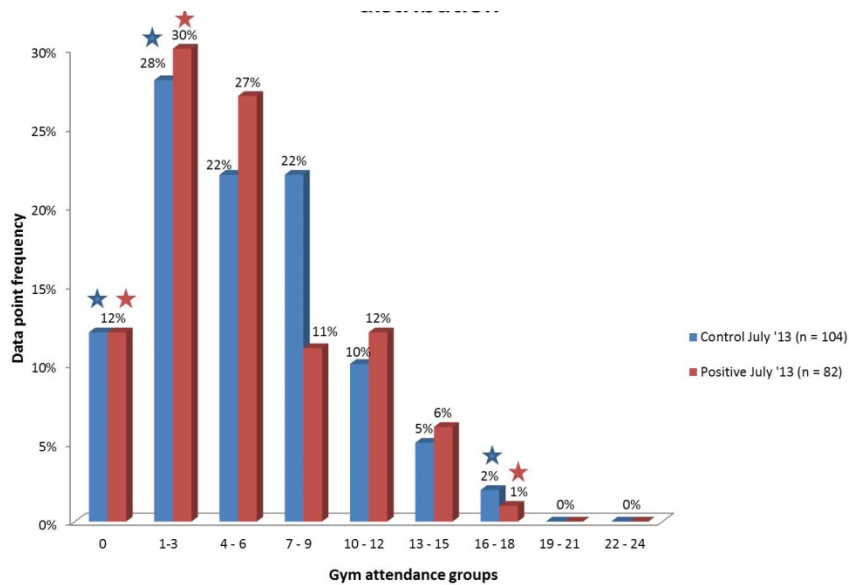
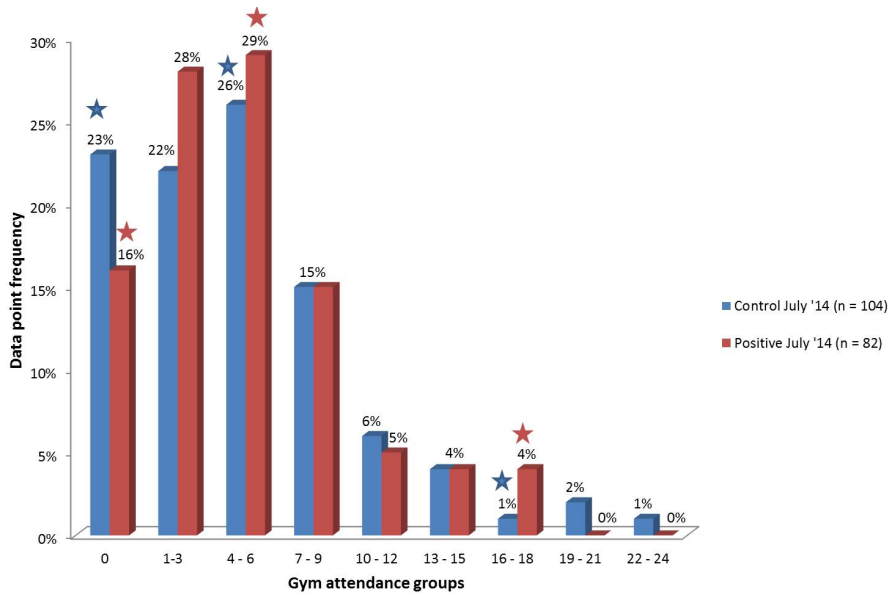


Figure 28: Comparing the distribution frequencies of the July 2014 Positive Group to the distribution frequencies of July 2014 Control Group



In summary: the positive intervention did not have any impact when judging its effectiveness by its smallest, peaking and largest groupings as there were no shifts which could be credited to the intervention.

Negative Group's May frequency distribution

When looking at the Negative Control's graph in figure 27 below, the smallest point is again zero. The cluster point differs in that the Control's is in group 1 to 3, while the Negative Group is in 4 to 6. The highest grouping differs quite a lot with the Negative Group (between 22 and 24) being two classes above the Control (16 to 18).

When comparing this to its 2014 counterpart (figure 28) the lowest data point is zero yet again. The Control's cluster point is still in 1 to 3, while the Negative Group's is also still in 4 to 6. The highest group had some shifts. The Control moved one class up to 19 to 21. The Negative Group on the other hand moved two down to 16 to 28 resulting in less people going as frequently as they did in May 2013.

Figure 29: Comparing the distribution frequencies of the May 2013 Negative Group to the distribution frequencies of May 2013 Control Group

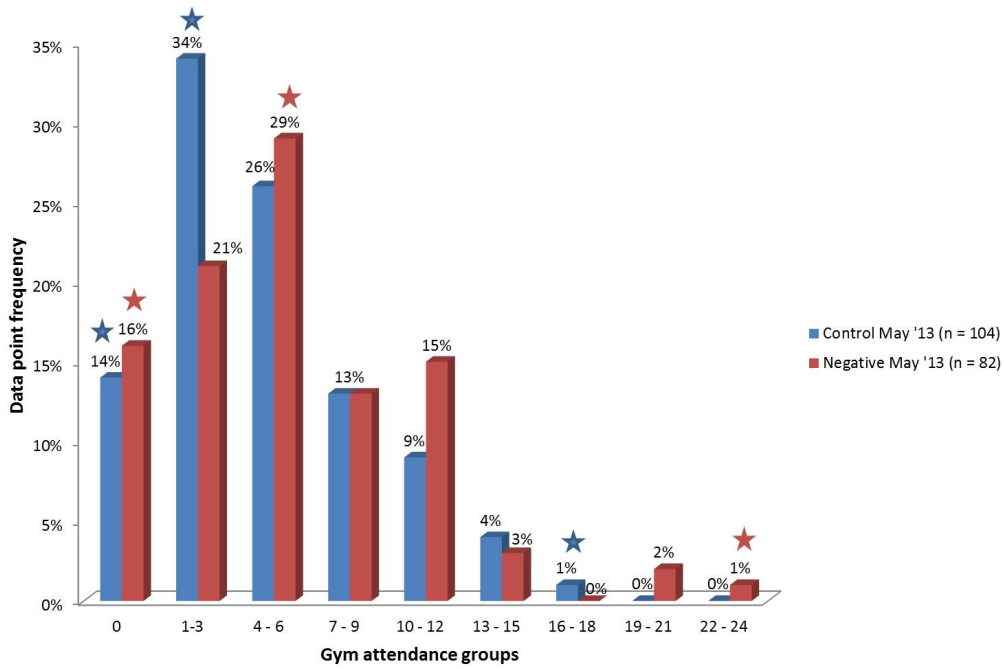
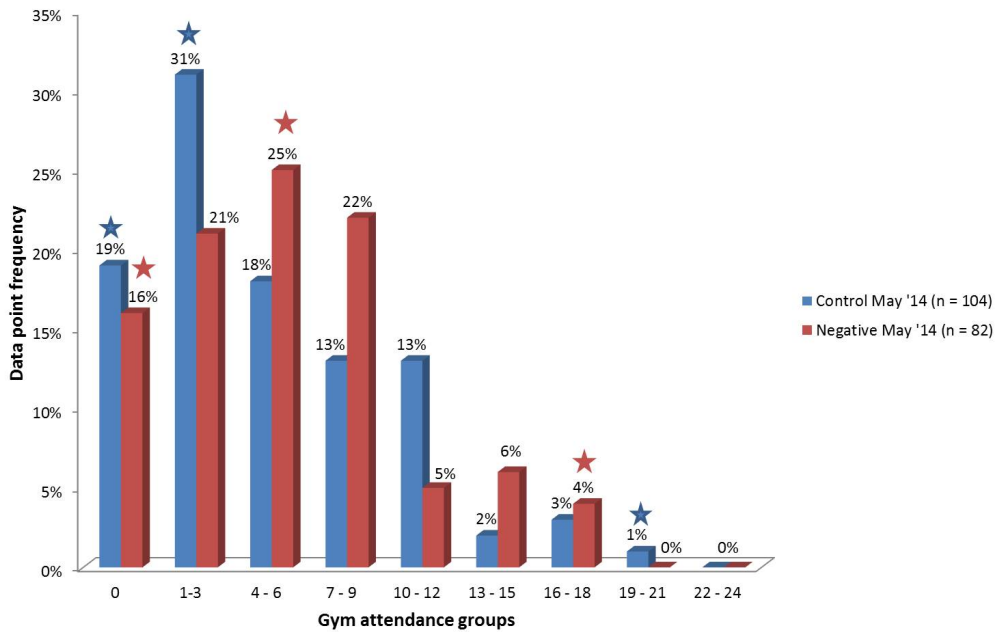


Figure 30: Comparing the distribution frequencies of the May 2014 Negative Group to the distribution frequencies of May 2014 Control Group



A potential negative impact has been observed due to the drop in the really active class. Other than that it shows a similar picture to that of the Positive Group – no real impact.

Negative Group's June frequency distribution

June 2013 is depicted in figure 29 below. Here zero is still the lowest point for both groups. The peaking point differs for the two groups with the Control being in the 1 to 3 group and the Negative in the 4 to 6 group. The highest data point is in 13 to 15 for both groups.

When comparing this data to 2014 in figure 30, the zero point is still the smallest point. When looking further to the cluster data point both groups stay within their respective groups. Finally the largest exercise data points did not stay within their original groupings. The Control Group moved from the 13 to 15 group to the 16 to 18 group. While the Negative Group also shifted from the 13 to 15 group but jumped to the 19 to 21 group.

This is quite different to what has been observed up to now due to the Negative intervention potentially assisted in getting people into the higher, more active group.

Figure 31: Comparing the distribution frequencies of the June 2013 Negative Group to the distribution frequencies of June 2013 Control Group

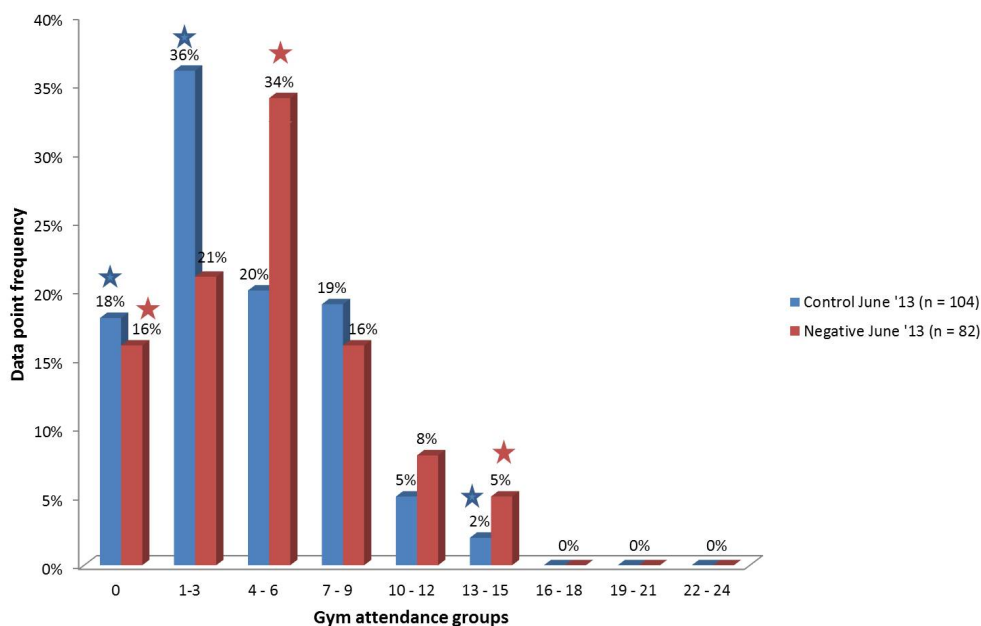
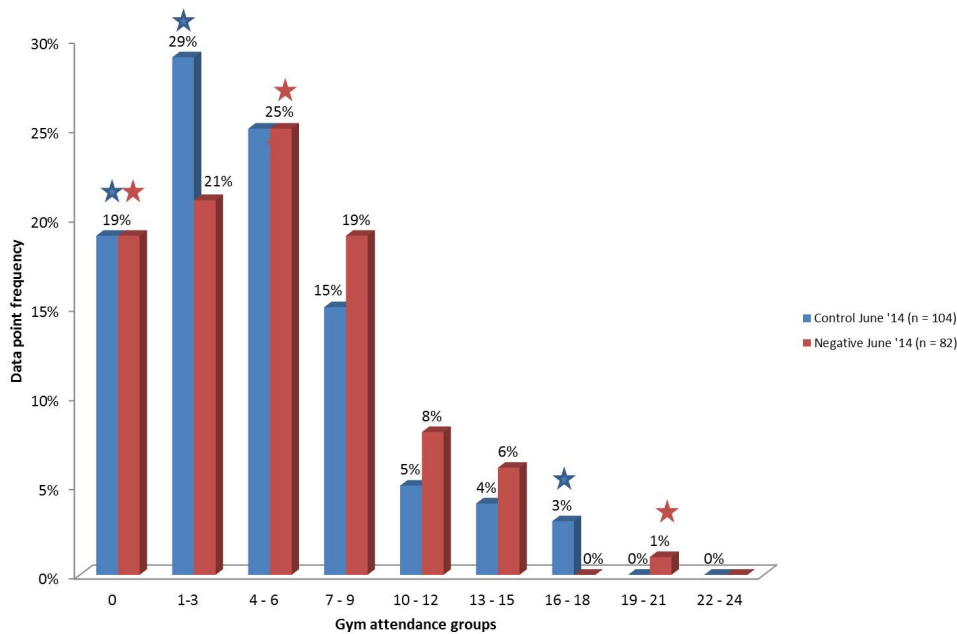


Figure 32: Comparing the distribution frequencies of the June 2014 Negative Group to the distribution frequencies of June 2014 Control Group



Negative Group’s July frequency distribution

Figure 31 depict July 2013’s figures. Zero is again the smallest point, followed by both groups’ clustering in the 1 and 3 group. The smallest point is also the same for both with the Control and Negative at 16 to 18.

In comparison the July 2014 graph (figure 32 below) shows how the zero point is still the smallest point, but the clustering point shifted for the two groups. The Negative Group stayed in the 1 to 3 gym attendance group while the Control shifted to a higher grouping (4 to 6). Without the help of any intervention people naturally became more active moving from 1 to 3 times a month to 4 to 6 times.

Both groups have shifted their largest exercise grouping. The difference is that the Control jumped two groupings to the between 22 and 24 grouping while the Negative moved only one (between 19 and 21). No real impact was again observed.

Figure 33: Comparing the distribution frequencies of the July 2013 Negative Group to the distribution frequencies of July 2013 Control Group

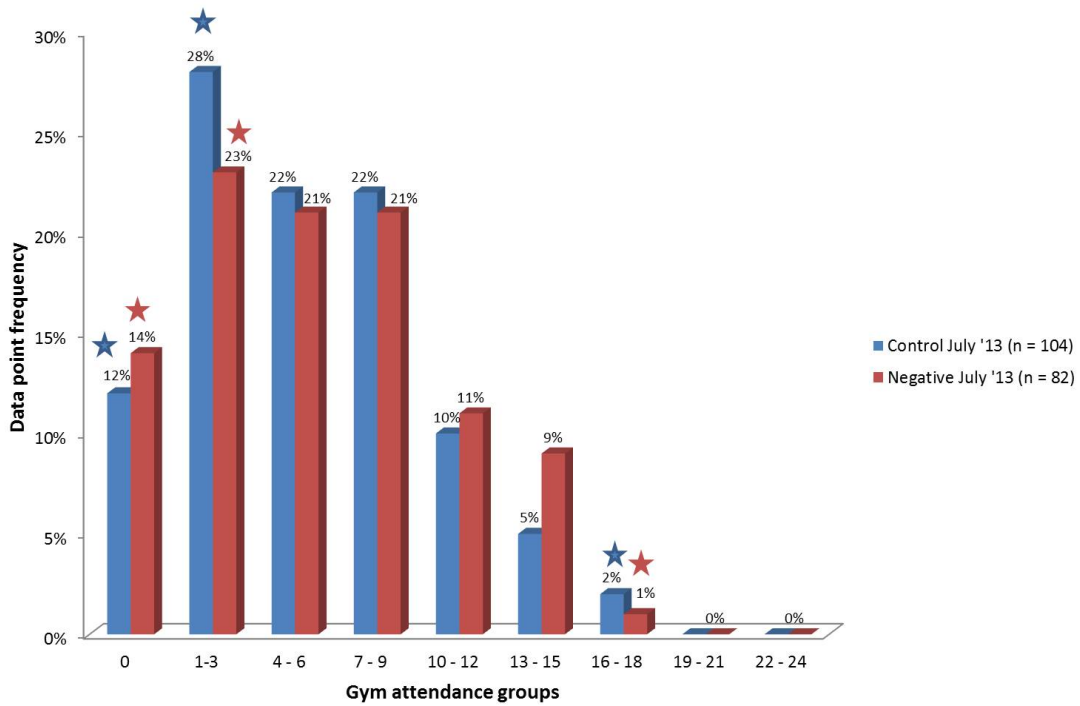
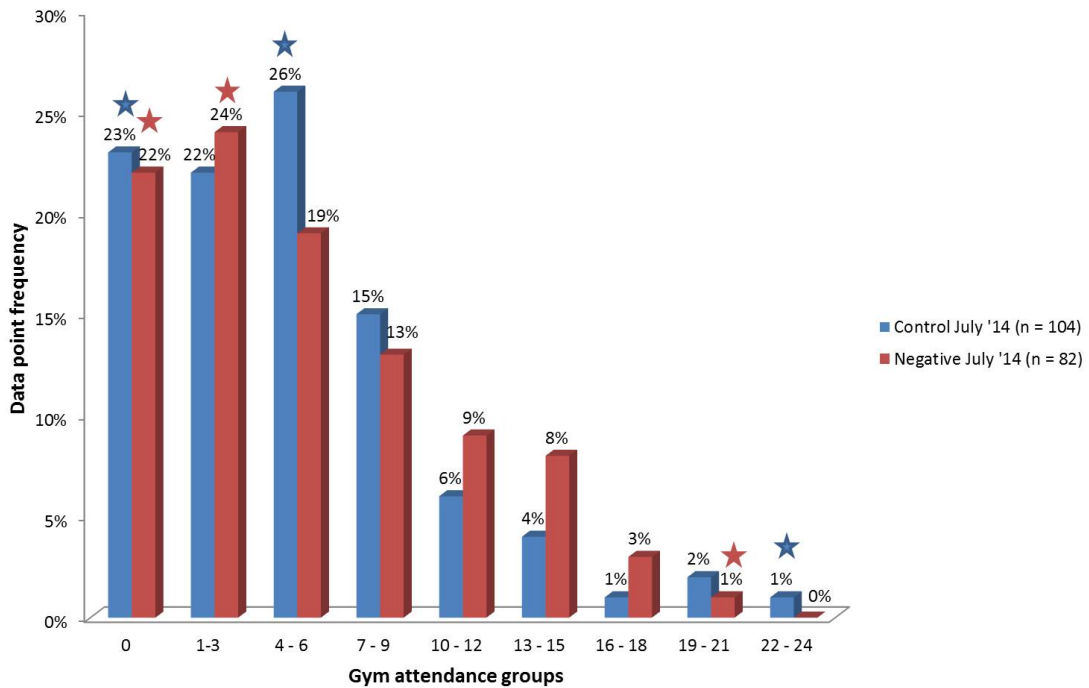


Figure 34: Comparing the distribution frequencies of the July 2014 Negative Group to the distribution frequencies of July 2014 Control Group



In summary: the negative intervention showed a similar picture to that of the positive. Except for June where the intervention could have assisted in those who exercise frequently to exercise even more, it had no further impact when judging the impact by its lowest, peaking and highest groupings.

The positive and negative intervention clearly did not have a major impact on changing behaviour. If it did there would have been clear shifts in the three measures observed across the different months. However as it was only one text message per week small changes could have taken place, with one or two people moving between the different groupings. If that happened it would mean the interventions did have an effect. A granular comparison between the growth and decline of the different groups' months could subsequently provide different results.

