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Exploring the impact of message framing on sustainable consumption choices

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration

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Abstract

This study is concerned with understanding the impact of message framing in influencing choice within the sustainable consumption domain. Over-consumption has been proven to be a main cause of environmental degradation, and a shift to sustainable consumption practices is needed. Yet research has found that despite knowledge of environmental issues, and a supportive attitude, pro-environmental behaviour amongst consumers is lacking, with a key influence being the lack of personal utility found in the pro-environmental choice. This study attempts to contribute to narrowing the knowledge attitude practice gap in this domain, by using message framing to isolate the personal utility available in a sustainable choice, thereby influencing a pro-environmental outcome.

A study was conducted to determine the main and interaction effects of various salient message frames (reference dependence, loss aversion and time sensitivity) on behavioural intention within sustainable consumption context. Environmental attitude was also tested to ascertain the interaction effect of this variable with the other independent variables and the resultant impact on the choice made. Variables were manipulated in a 2x2x2 factorial design. Results yielded the hypothesised significance of main effects for time sensitivity, but not for reference dependence or loss aversion. In addition no three way interaction for reference dependence by loss aversion by time sensitivity was found. No interaction was found between message

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frame and environmental attitude. Implications for social marketers engaged in the promotion of pro-environmental behaviours are discussed.

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Key Words

message framing

sustainable consumption

knowledge attitude practice gap

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Declaration

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

Dhatchani K. Naidoo

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List of Abbreviations

GF	Gain frame
KAP	Knowledge Attitude Practice
LA	Loss aversion
LF	Loss frame
LT	Long term
MF	Message Framing .
NPPI	No positive personal impact
PPI	Positive personal impact
RD	Reference dependence
SC	Sustainable consumption
SM	Social marketing
ST	Short term
TS	Time Sensitivity

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1. Introduction to the research problem

1.1. Research title

The study is entitled "Exploring the impact of message framing on sustainable consumption choices".

1.2. Background to the research problem

> "*Current global consumption patterns are unsustainable…. Efficiency gains and technological advances alone will not be sufficient to bring global consumption to a sustainable level; changes will also be required to consumer lifestyles, including the ways in which consumers choose and use products and services*."
>
> World Business Council for Sustainable Development (WBCSD), 2008

The excerpt above from a global coalition of corporate business leaders committed to sustainable development highlights a growing perception that individual consumers and households have a significant role to play in humanity's transition towards a sustainable existence. Given the context of this global imperative, the research at hand is located within the realm of social marketing and is centrally concerned with the influence of individual consumer choice in the direction of more sustainable options. The sections that follow contextualise the importance of sustainable consumer choice and highlight barriers to pro-environmental choice, thereby clarifying the need for the research.

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1.2.1. Sustainability and human consumption as an issue

There is a heightened awareness globally of the impact of human consumption activity on the earth's natural resources, with issues such as global warming, ozone depletion, water and air pollution, loss of species, and farmland erosion threatening both the environment and human life (Tanner and Kast, 2003). Human consumptive behaviour presents an issue for the environment and society from the perspective that unabated consumption, use and disposal of products and services, negatively impact the physical environment and the people that inhabit it. Past consumptive behaviour has resulted in devastating impacts such 60% of the earth's ecosystem services being degraded in the past fifty years, while predicted future consumption patterns for energy and natural resources show an expected rise in natural resource consumption to 170% of the Earth's bio-capacity by 2040 (WBCSD, 2008).

Much of the blame for the strain on the earth's resources has been placed on development as a result of the modern consumption culture (Poulsen and Wooliscroft, 2009), and the trend of 'conspicuous consumption' defined by the United Nations Development Programme (UNDP) as the presence of heavy societal pressure to maintain high consumption patterns, and where competitive spending and displays of wealth are encouraged by society (WBCSD, 2008). The rise of a global middle class (predicted as 80% of the world population) is expected to have further negative impact, with middle income consumers in a global economy displaying similar consumption preferences to 'global elites'(WBCSD, 2008).

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However, despite the increased prominence of the topics of sustainability and sustainable consumption on the world stage over the past decades (evidenced by global events such as the United Nations Conference on Environment and Development (UNCED) in 1992, the World Summit on Sustainable Development in 2002, and the Copenhagen Climate Change Conference in 2009), international government has been slow to take on the challenge of curbing consumption and production activity, possibly due to the negative effect that reduced consumption is likely to have from an economic point of view (Bond, 2005). This places greater responsibility on the shoulders of consumers to moderate their own consumption behaviour, thereby placing pressure on industry, as the actions and demands of consumers can be powerful signals to retailers and manufacturers to behave more responsibly (Tanner *et.al.*, 2003).

1.2.2. The role that consumers play in sustainable consumption

Tanner *et.al.* (2003) note that any remedy to over-consumption would require changes in human behaviour and cultural practices to reduce consumption. These changes would require a move to more environmentally responsible consumer behaviour, which is defined a those consumption activities that benefit, or cause less harm to the environment than substitutable activities (Haron, Paim & Nahaya, 2005). Hence consumers can behave in a more environmentally friendly way by changing the patterns they use to acquire, utilize and dispose of goods or products (Haron, *et.al.*, 2005).

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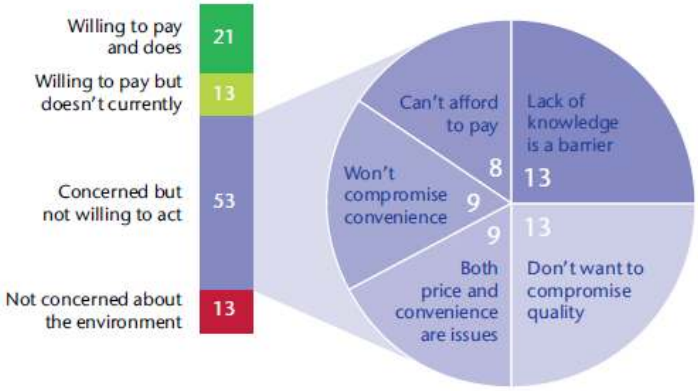
However consumers have been noted as exhibiting a disregard for the effect of their actions on the environment and society (Poulsen *et.al.*, 2009). Despite an increased awareness of issues such as sustainability and green consumption, consumers appear not to have significantly altered their consumption behaviour as evidenced by the "fairly low [market] share of ethical products and brands" (d'Astous & Legendre, 2009, p.256). The literature indicates that the primary reason for this is that consumers are not motivated by the morality or the ethical nature of their consumption choices, but are more interested in the personal consequences that these choices have for them (Poulsen, *et.al.*, 2009). This notion is supported by recent global survey by McKinsey & Company across a range of developed and emerging economies, which indicates that a lack of concern for the environment is not the barrier, but rather an unwillingness to act primarily due to the perceived negative personal consequences of action (see Figure 1 below).

Figure 1: The Gap between consumer attitude and behaviour



Source: *McKinsey Quarterly Global Survey, September 2007*
Global retail consumers segmented by willingness to pay for products with environmental and social benefits – Survey of consumers in Brazil, Canada, China, France, Germany, India, UK and the US.

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This is likely a result of social conditioning within an increasingly consumptive culture where the personal (functional or emotive) benefits of a global array of goods and services have been the dominant message in marketing communications with customers (Rothschild, 1999).

1.2.3. The problem faced by social marketers

The self-orientation of consumers noted above poses a problem for sustainable consumption in general. Given that a sustainable consumption choice will always be for the benefit of society (and not the self) through impacting environmental preservation, those interested in promoting socially responsible consumption are faced with the question of how to influence responsible behaviour. Accepting that individual consumers have a role to play in bringing about the change needed, social marketers are faced with the problem of bridging the gap between environmental concern and action, and breaking down the barriers to action faced by consumers.

The current study attempts to equip the social marketer with an additional means by which to do this, by proving message framing, as derived from Kahneman and Tversky (1979) prospect theory, to be a marketing tool (an external stimulus within the social marketer's control) which can be used to influence choice within this domain.

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1.3. Research objectives

The fundamental question that this research aims to answer is: "*Can message framing be used to influence the transition from pro-environmental attitude to pro-environmental choice within a sustainable consumption context?*"

The main objectives of the research will be:

- Objective 1: to determine if message framing can be used to influence the intention to behave sustainably
- Objective 2: to determine if the combination of message and environmental attitude improves pro-environmental behavioural intention, thereby contributing to an understanding of the gap between environmental attitude and behaviour.

1.4. Research scope

Sustainable consumption is a wide domain consisting of many subsets of behaviours. For the purposes of this study a distinction is drawn between sustainable consumption at a macro national or international level, and sustainable behaviours exhibited by individual consumers. This study is focused on the influence of consumer decisions at individual or household level. To this end the research instrument used and the analysis that follows will focus on everyday consumption behaviours such as the use of energy saving devices and recycling of household waste.

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1.5. Report Layout

The layout of this report is as follows:

- Chapter 1: Introduction (this chapter) – describes the research problem, research objectives and research scope;
- Chapter 2: Literature Review – presents the literature relating to the research problem; with the three key focus areas being i) sustainable consumption, social marketing and the attitude behaviour gap, ii) the role of cost and exchange as influences on consumer choice within social marketing, and iii) the benefits of an interdisciplinary approach in understanding attitude conversion to behavioural intention;
- Chapter 3: Research Hypotheses – lists the various research hypotheses to be tested in relation to this research;
- Chapter 4: Research Methodology – presents the details of the approach and methodology adopted, sample characteristics, sampling and data analysis procedures followed;
- Chapter 5: Results – the findings of the research specifically in relation to the hypotheses are presented in this chapter;
- Chapter 6: Discussion of Results – the data presented in the preceding chapter is discussed and explained in relation to the research problem posed in Chapter 1,

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the literature presented in Chapter 2 and the research hypotheses posed in Chapter 3;

- Chapter 7: Conclusion – this chapter concludes the report by highlighting the main findings and how these findings are of relevance to practitioners in the field of social marketing. Recommendations for future research are presented;

- Chapter 8: References – provides a list of all literature and information sources used in the research;

- Appendices – the questionnaires used, as well as the scenarios compiled are contained in the appendix to the report.

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2. Literature Review

This section is divided into three main subheadings that are relevant to the exploration of the topic at hand.

- In order to contextualise the problem, the first section discusses the influence of sustainable consumption at the individual level as a domain within social marketing. Difficulty in converting attitudes to behaviour within social marketing is discussed, and the impact of perceived consequences (costs) is highlighted as an impediment to choice within sustainable consumption specifically.
- The second section explores the concepts of cost and exchange within the social marketing domain, borrowing from economic theory to understand the theoretical underpinnings of how consumer decisions are made within the context of risky choice, that is where certainty of the outcome is not explicit. The relevance to sustainable consumption is expanded upon.
- The third section concludes by discussing how the interdisciplinary approach taken contributes to the knowledge relating to the conversion of attitudes to behavioural intention within the sustainable consumption domain.

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2.1. Sustainable consumption as a domain within Social Marketing

It is argued that the influence of sustainable consumption behaviours falls within the domain of social marketing (SM) (Peattie & Peattie, 2009). Though sustainable consumption (SC) is a discipline that has received much attention in the macromarketing academic literature in its own right, the key underpinnings of SC relate to the link between consumption choices made by individuals and how these combine to impact aggregate consumption levels at a regional, national or international level (Schaefer & Crane, 2005, Kilbourne & Carlson, 2008). It is argued below that the influence of these individual consumption behaviours for 'the greater good' may be construed as SM.

A well accepted definition of SM put forward by Andreasen (1994, p110) assists in supporting the relevance of SC within this domain:

> *Social marketing is the adaptation of commercial marketing technologies to programs designed to influence the voluntary behaviour of target audiences to improve their personal welfare and/or that of the society of which they are a part.*

Both the influence of voluntary behaviours, and the improvement of the welfare of society noted here are central to the concept of SC which is concerned with the need to reduce consumption levels of significant numbers of people at individual and household level, in order to impact the long term social goal of reducing currently unsustainable aggregate consumption levels (Schaefer *et.al.*, 2005).

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Furthermore, given SM's concern with addressing social problems (Brenkert, 2002) it is necessary to classify unsustainable aggregate consumption as such in order to further support the argument. Using Brenkert's (2002) definition of a social problem, unsustainable aggregate consumption can be classified as such because:

a) It negatively impacts on the wellbeing of those other than the individuals making the consumption choices. As each individual engages in self-interested behaviour short-term individual interest is advanced while longer-term societal interest is harmed (Kilbourne *et.al.*, 2008). This is particularly so in the case of 'affluent' consumption undertaken by certain sectors of society, the consequences of which spill over to less affluent sectors (Schaefer *et.al.*, 2005)

b) It has been identified as a concern by parties independent of the individual consumers, where the consumers themselves might not necessarily believe that they contribute to a social problem (Bond, 2005)

c) Those exhibiting unsustainable consumption behaviours are unable (due to lack of knowledge or ignorance) or unwilling to expend the resources they have in a way that will solve the problem. The literature notes numerous instances (Peattie, 2001; McCarty & Shrum, 2001; Gupta & Ogden, 2009) where consumers fail to make sustainable consumption choices despite awareness of the impact of their behaviour. Brenkert (2002) notes that without the existence of this third criterion specifically, social marketing would be unnecessary as individuals would simply allocate resources to addressing the social concern, and the problem would not exist.

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Having established unsustainable aggregate consumption as a social problem, a distinction is drawn between achieving SC at the macro level, and the 'operationalisation' of SC by influencing sustainable consumption choices at the micro level which is where SM is of use. SM may be used as a tool that assists in achieving SC over time. Similarly a clear distinction is drawn between SM within this context, which has social benefit as its primary focus (Peattie *et.al.*, 2009) and 'green marketing' which has the firm's benefit as its primary focus (due to the necessity to ensure customer satisfaction and thereby firm profitability), and social benefit as a secondary focus (Ottman, Stafford & Hartman, 2006).

Having established the overlap between influencing sustainable consumption behaviours at the individual level and social marketing, the section that follows aims to understand consumer behaviour within the social marketing context.

2.1.1. Attitude behaviour discrepancies in the social marketing context

A defining characteristic of SM is behaviour change, and a SM campaign's ultimate criterion of effectiveness is behavioural influence (Andreasen, 2003). Given this preoccupation with changing behaviour, the literature in this field has focused on the conceptualisation and evaluation of behavioural change theories and models to understand consumer behaviour (Andreasen, 2003). Rothschild (2009) notes that the most common categorisation of behavioural responses sought by social marketers is based on the Stages of Change model, also known as the Transtheoretical model (Alcalay & Bell, 2000), however other prominent models include the Theory of

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Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) (Alcalay *et.al.*, 2000). These models describe (completely or in part) a continuum along which consumers progress (and social marketers hope to influence) as they move towards action, that is, awareness/knowledge, attitude, intention to behave, trial behaviour, and/or repeat behaviour (Rothschild, 2009).

A **knowledge - attitude - practice (KAP) gap** is well documented within this field (Alcalay *et.al.*, 2000), represented by the presence of awareness relating to a subject, a supportive attitude, but a failure to translate attitude into behaviour. Though Frame and Newton (2007) note sustainability to be a new area for social marketing campaigns, evidence of the KAP gap within this realm has also been found in other studies not specifically related to SM campaigns (Peattie, 2001; McCarty *et.al.*, 2001; Devinney, Eckhardt & Belk, 2009; Gupta *et.al.*, 2009).

Within the health realm, noted by Andreasen (2002) as SM's field of deepest market penetration, attempts to understand the KAP gap have included the consideration of mediating factors such as perceived efficacy/ behavioural control, social or cultural norms, perceived risk, and attitudes about the behaviour itself (Alcalay *et.al.*, 2000). However Gupta *et.al.* (2009) note that the literature reveals scepticism within the environmental domain regarding the ability of environment specific attitudes to predict environment friendly behaviour, citing examples of where both strong and weak relationships have been found between the two variables. Attempts at explaining the disconnect in the environmental domain have included differing levels of specificity in the attitude-behaviour measures (that is failure to measure behaviour-

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specific attitude and instead focusing on general environmental attitudes), the effects of external variables (such as motivation, social norms or economic constraints) and low correlations between environmental behaviours performed by the same individual (for example, carpooling and recycling of household waste) (Mainieri, Barnett, Valdero, Unipan & Oskamp, 1997).

The section that follows provides evidence of personal consequence of the environmental behaviour as a key influence in the decision to perform the behaviour, and asserts that a further understanding of the KAP gap in this domain is achieved by exploring the impact of personal cost on the consumption decision.

2.1.2. Personal cost as key influence on sustainable consumption choices

In their research on understanding SC practices, Follows and Jobber (2000) conclude that the weak link between attitude and behaviour can be explained by the omission of the measurement of behavioural intention (in the KAP gap). The construct of intention is predicated on both attitudes regarding environmental and personal consequences of the purchase behaviour, where attitudes towards the former positively affect behavioural intentions, and attitudes towards the latter negatively affect behavioural intentions (Follows *et.al*., 2000). These results establish that equal salience should be attributed to the means by which consumers evaluate personal consequences (costs), as is given to the evaluation of environmental consequences.

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Considerable supporting evidence noted below highlights the prominence of self interest/ personal impact in sustainable consumption choices. Poulsen *et.al.* (2009) note work done by previous authors in trying to explain the discrepancy between attitude and behaviour, and highlight the following (self orientated) reasons:

- Unwillingness to accept the increased cost of doing good in terms of added inconvenience and monetary expense
- Self interest and dominant focus on self leading to less regard for others and the environment

In addition, Carrigan & Attalla (2001) in their work on the role of ethics in consumer choices, provide evidence that consumers buy for personal reasons, not societal ones. This sentiment is supported by 'd Astous *et.al.* (2009) who argue that consumers are more motivated by self-interest than by the interests of society and that the adoption of socially responsible consumption behaviours would be favoured if such behaviours led to concrete positive benefits for them. There is further support for this argument by Gupta *et.al.* (2009, p377) who comment that despite holding a positive attitude toward environmental conservation "[most consumers] make purchase decisions to maximize self-interest because in their view, the costs of cooperation outweigh the uncertain utility obtained from it".

The literature reviewed above highlights that while knowledge and attitude are important initial steps on the continuum toward behaviour, the translation of attitude into behaviour requires further scrutiny. The intention to behave is a key construct preceding actual behaviour, and is influenced by consumers' concern with the personal impacts (costs) of their consumption decisions, and the value that they derive from

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these decisions relative to these costs. The section that follows elaborates on the implications of personal costs within the SM domain.

2.2. Consumer costs and the basis of exchange in SM

2.2.1. Consumers' perceived costs within the SM domain

Consumer perception of costs presents a particular challenge to influencing behaviour within the SM domain (see the seminal article by Bloom & Novelli, 1981). Unlike the tangible (monetary) costs involved in consumer marketing, those involved in SM could be either monetary, psychological, energy or time based (Bloom *et.al.,* 1981; Wood, 2008), are not easily quantifiable, are open to interpretation by the consumer, and are often not easily adjustable (Bloom *et.al.,* 1981). 'Price' within the SM context has been likened to the broader transactional cost concept of price derived from economics (Peattie *et.al.*, 2009), implying a compounding of tangible and intangible costs in the evaluation of a choice. This creates complications for the social marketer wanting to create value within an exchange, as the intangible costs in this realm dominate, and are subjective and therefore more difficult to measure and overcome (for example the inconvenience associated with carpooling is subjective). The marketer's influence over costs resides within the explicit acknowledgement of the costs and benefits associated with a decision, and in efforts to minimize the perception of costs by consumers (Bloom *et.al.*, 1981, Alcalay *et.al.*, 2000).

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The section below seeks to highlight that the intricacies of exchange within the SM domain are a further means through which the clarity of the benefit (the utility) to the consumer becomes clouded, thereby further compounding the psychological costs involved.

2.2.2. The notion of exchange within social marketing

It should be noted that any consumption behaviour, sustainable or not, is premised on the concept of *exchange*; the individual wants something that he/she considers of value, and is required to give something considered of value in order to get it (Glenane-Antoniadis, Whitwell, Bell & Menguc, 2003; Peattie & Peattie, 2003). With normal consumption behaviour, the individual acts primarily out of self interest, the benefits of the exchange are discernible, and tangible to the extent that there is reasonable certainty that they will accrue (to the individual) in the short term (Rothschild, 1999). Within the SM realm the basis of exchange becomes much more complicated; the benefit often does not accrue to the individual, but rather to society at large, and the gain is often future based, and difficult to conceptualise (Rothschild, 1999; Wood, 2008). This further compounds the negative perception of cost explained earlier. Glenane-Antoniadis *et.al.* (2003) have modified the concept of exchange in this context and describe it as 'intricate'; they explain that it could be utilitarian based (economic and relatively tangible), symbolic (psychological, social and intangible) or a mixture of the two.

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In understanding how to influence behaviour within this more complicated context, it is useful to understand the cognitive underpinnings of how individuals make consumption choices, and explore the applicability of this theory within the social marketing domain. In doing so economic theory is referenced, as this is one of the core theoretical bases which explores how consumer decisions are made and how choices are evaluated against each other.

2.2.3. Decision making as rational economic choice

As explained above, exchange theory is accepted as one of the dominant behavioural theories within the realm of consumer choice. The theory suggests that a (social) marketing intervention involves a voluntary exchange of resources, where the 'buyers' (target consumers) weigh up the costs and perceived benefits associated with the social marketing product, and will proceed with the transaction only if the perceived benefits outweigh the perceived costs. (Alcalay *et. al*., 2000).

Exchange theory is a theory of rational choice premised on **Expected Utility Theory** one of the original theories of economic choice which prescribes how individuals should act when they are faced with uncertain choices. Barth, Hatem and Yang (2004) offer a simplified definition of expected utility theory explaining that it assumes that individuals are able to accurately measure the utility of various alternatives (irrespective of how they are presented to them), and make rational decisions based on the value that they assign to each alternative. Other assumptions of the model are that "rational individuals should act in a manner so as to maximise their utility" (Barth

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et. al., 2004, p151). The standard assumption was that the final stage/state is what mattered in determining the choice (Novemsky & Kahneman, 2005). Under this model is it would therefore make sense that a rational individual faced with the prospect of losing access to clean air in the future, would modify behaviour to reduce the likelihood of this occurring. Yet this does not occur, providing evidence for the claim that expected utility theory is an inadequate descriptive model to explain how decisions are actually made (Johnson, 2004), and highlighting the deficiency of this theory in taking into account the emotional and psychological aspects of consumer decision making.

2.2.4. The Psychological aspect of decision making

The dominant alternative to expected utility theory has emerged as **Prospect Theory** introduced by Kahneman and Tversky, to explain why the tenets of utility theory do not hold, that is why people do not always make rational choices (Kahneman *et.al.* 1979). While not disregarding the importance of utility (upon which the exchange is based), prospect theory is operationalised by replacing the economic utility function of expected utility theory (which assumes perfect rationality amongst consumers) with a weighting function and a value function to explain people's preferences (Barth *et. al*., 2004).

Jones (2007, p76) notes that an important distinction between expected utility theory and prospect theory is that in the latter the *weighting* equates to a "psychological decision weight as opposed to a mathematical probability used in expected utility

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theory". The psychological weight takes into account the decision makers judgement/perception of the probability of the outcome occurring (Johnson, 2004), and is therefore perhaps more suited to intricate decisions.

Jones (2007) further elaborates that the *value* function has three characteristics:

a) *Reference dependence*; the carrier of an attribute's value is not its absolute level, but rather its deviation from some reference point, that is a gain or loss relevant to the reference point (Khaneman *et.al.*, 1979). This contradicts the standard utility model described by expected utility theory (Novemsky *et.al.*, 2005).

b) *Loss aversion*; the psychological effect that individuals are more sensitive to losses than to gains of equivalent proportions (Khaneman *et.al.,* 1979), and therefore more risk averse when it comes to gains, and risk seeking when it comes to losses, that is preferring a small certain gain than a large uncertain gain, and a large uncertain loss to a small certain loss (Smith and Berger, 1995).

c) *Diminishing sensitivity*; the marginal value of both gains and losses decreases with their size, and so the immediacy of the gain or loss impacts on the value derived (Khaneman *et.al.*, 1979)

This process of choice described above can be simplified graphically into the following equation:

Figure 2: Utility evaluation in Prospect theory

$$\text{UTILITY} = \begin{matrix}\text{Percerved}\\ \text{certainty}\\ \text{of outcome}\end{matrix} \times \left(\begin{matrix}\text{Nett effect}\\ \text{Reference}\\ \text{Dependence}\end{matrix} + \begin{matrix}\text{Nett effect}\\ \text{Loss Aversion}\end{matrix} + \begin{matrix}\text{Nett effect}\\ \text{Time}\\ \text{Sensitivity}\end{matrix} \right)$$

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Prospect theory was originally developed and applied in a simple context. Hardie, Johnson and Fader (1993, p377) note that it was developed to "describe choice amongst simple risky prospects, that is, probabilistic outcomes described by a single attribute (often amounts of money) and few outcomes". Kahneman *et.al.* (1979) themselves noted at the time of its development that the model was not restricted by this particular application, that is that it could be applied to any number of outcomes, or to choices involving non-monetary attributes (saving lives or quality of life being the examples given), or even to choices where the probability of the event/outcomes is not made explicit.

2.2.5. Prospect theory in the context of sustainable consumption

While no example has been found of the use of prospect theory in the SC setting specifically, the model has been applied in a wide range of SM contexts, for example organ donation (Reinhart, Marshall, Feeley & Tutzauer, 2007), health marketing (Shen & Dillard, 2007) and income taxation (Kanbur, Pirttila & Tuomala, 2008). In applying the theory to the current context it is proposed that the 'utility' perceived by the consumer, and thus the basis on which the exchange takes place, can be influenced through several areas, discussed below.

The **perceived 'riskiness'** of the outcome, that is, how likely the consumer believes the outcome to be. This proves difficult as social marketers themselves are not able to offer certainty of the outcome they are selling. Alcalay *et.al.* (2000) note that one of the defining characteristics of SM in general is that there is no certainty

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of gratification for the consumer as can be found in traditional marketing; there is only the increased probability of a particular outcome if the recommended changes are adopted. For example a consumer can contribute to the conservation of water resources. However it cannot be proved with certainty that the behaviour change advocated will bring about the particular outcome (Alcalay *et.al.* 2000).

The **reference point** from which the decision is made. Prospect theory states that the value obtained from an action is the change relative to the reference point, not the end outcome that is reached (Jones, 2007). The reference point acts as the anchor from which the decision is made. It follows that the positioning of the reference point is particularly important, as it affects whether the consumer evaluates the choice as a gain or a loss (Jones, 2007). In the SC context, where concepts such as responsible consumption, consumption reduction and voluntary simplicity form the basis of the message to consumers, traditional perception of the change is likely to be that of a loss (negative as it will involve loss of indulgence, loss of convenience, loss of time, loss of money) and will be evaluated against the reference point of the consumer's current situation, that is the status quo. It follows that by altering the reference point the change can be seen as either positive or negative.

Loss aversion – Related to the point above, depending on whether it is possible to alter the reference point, the outcome can be evaluated as a gain or loss (Jones, 2007). When choosing between two options people tend to be risk averse when

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the outcome is perceived to be a certain gain, and risk seeking when the outcome is perceived to be a certain loss (Barth *et. al*., 2004; Jones, 2007)

The impact of **diminishing sensitivity** - As with riskiness, this aspect proves problematic for influencing sustainable choices as losses/costs are immediate, whereas gains/benefits are likely to be abstract and future based (Rothschild, 1999; Wood, 2008).

The preceding analysis indicates that in influencing sustainable choices the aspects of particular relevance to the social marketer are those of reference dependence, loss aversion and diminishing sensitivity, given that these are elements that the marketer is able to influence, as opposed to certainty of outcome which cannot be predicted in SM contexts. This leads to the discussion of message framing below.

2.2.6. Message framing and its applications

Jones (2007) makes the point that prospect theory presents an opportunity for events or outcomes to be evaluated differently, depending on how they are framed.

"The manner in which alternatives are framed alters their desirability, so that … choices can be manipulated through alternative framing methods" (Barth *et.al.,* 2004, p152). Orth, Oppenheim and Firbasova (2005, p314) specify that in the context of prospect theory, message framing (MF) refers to the way "objectively equivalent information is presented", and that it has been applied either by focusing on positive

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product attributes (benefits gained through product use) or by focusing on negative product attributes (benefits lost by not using the product).

While the work done by Kahneman *et.al.* (1979) initially proposed the loss frame(negative frame) to be most persuasive, empirical research dealing with the effects of information framing on choice has produced mixed results (Hanuk and Aggarwal, 2003; Grau and Folse, 2007). For example, the view that positive framing is more effective in terms of persuasion is supported by Berger and Smith (1998) who showed that positive framing had greater effect in promoting durable consumer goods such as video cameras, as well as Rothman and Salovey (1997) who showed that positively information was also more effective in encouraging healthy behaviours including intentions to exercise and the use of infant car seats, sunscreen, and condoms. Contradictory results are shown by a number of studies, where a negatively framed message has been more effective. Examples include the consequences of performing breast self examinations (Meyerowitz and Chaiken, 1987 in Smith *et.al.*, 1995 and Grau *et.al.* 2007), cholesterol testing (Maheswaran and Meyer-Levy, 1990) and increased credit card usage (Ganzach and Karsahi, 1995). This apparent contradiction in results is explained by Grau *et.al.* who note that the effects of MF may vary under different conditions, and that contextual effects in particular, such as social or cultural dimensions have been suggested to affect consumer response to a particular frame.

Worth noting also is that the examples listed above and indeed the focus of much of the work on MF pertains to the exploration of loss or risk aversion (gain/loss framing)

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as originally proposed by Kahneman et.al. (1979). However Shah, Kwak, Schmierbach and Zubric (2004, p102) note that research has explored various means through which the framing of information may shape the processing of such information, and note that the narration or reporting of information may be "constructed in ways that … subtly alter the activation of thoughts about a topic among members of the audience".

Within the communications or advertising field specifically Pervan and Vocino (2008) note the framing typology of Levin, Schneider and Gaeth (1998) as a holistic and comprehensive account of framing effects, which draws distinction between three types of framing; a) attribute framing (highlighting a particular characteristic of an object or event), b) goal framing (involving the framing of information relating to the consequences of an action or behaviour) and c) risky choice framing (relating to the outcomes of alternative choices which have different levels of risk and derived from prospect theory research).

Applying message framing to the influence of sustainable choice

Rothschild (1999) notes that modern consumptive culture (often hailed as the culprit behind unsustainable consumption levels) is attributed to a large extent to commercial marketing appealing to the individual's self perception of short and long run self interest – individuals' have become conditioned over time to expect a self interest benefit in marketing communication. Within this study, and given its overall purpose of bridging the KAP gap, it is proposed that MF (specifically goal and risky choice framing) may be used to highlight the self-interest benefit in a sustainable choice

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decision, thereby altering the evaluation of the utility received from this choice and influencing the transition from pro-environmental attitude to pro-environmental behavioural intention.

Should MF prove to be a means through which the SC choice can be influenced, an opportunity arises for the tone of SM messages within the SC domain to change. Marketers would have the option to move away from guilt as the key driver of these messages, where consumers are admonished for driving their cars or buying non-environmentally friendly products (Peattie *et.al.* 2009). Real consumer orientation may be displayed by understanding and taking into account the selfish motivations of consumers, and altering the marketing execution and message accordingly to achieve the desired result. MF, through its ability to influence information processing and out-take, has value to the social marketer as a tool from within his/her mix of marketing elements with which consumer choice may be influenced.

2.3. Conclusion

The research aims to contribute to the social marketing literature by proving MF, an aspect drawn from economic theory of decision making, to be an additional means through which the conversion of attitudes to behavioural intention might be influenced. The domain of the research is indicated by the dotted line in Figure 3 overleaf, and the rationale for how this study proposes to use MF in addressing the KAP gap is explained thereafter.

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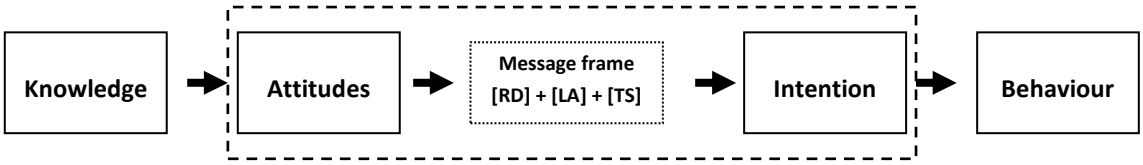
Figure 3: Knowledge-Attitude-Intention-Behaviour framework



Influencing individual and household consumption decisions has been highlighted as necessary in order to impact aggregate consumption levels (Schaefer *et.al.*, 2005). The literature highlights that despite awareness and a pro-environmental attitude, one of the greatest stumbling blocks in sustainable consumption is the conversion of this attitude to behaviour (Peattie, 2001; McCarty *et.al.*, 2001; Carrigan *et.al.*, 2001; Devinney, *et.al.*, 2009; d'Astous *et.al.,* 2009; Gupta *et.al.*, 2009). The intention to act after considering environmental and personal consequences (attitudes) of the action is a good predictor of behaviour (Follows *et.al.,* 2000). However the personal consequences (costs) of pro-environmental choice weigh in heavily on the decision to act (Carrigan *et.al.*, 2001; d'Astous *et.al.,* 2009; Poulsen, *et.al.*, 2009). Furthermore given the complexity of costs within the SM domain, social marketers are tasked with trying to minimize cost perceptions and maximise benefit perceptions in order to create value within the exchange (Bloom *et.al.*, 1981, Alcalay *et.al.*, 2000).

This research will attempt to add to the SM literature by exploring the area that intervenes between attitudes and intention, and is specifically concerned with influences on how utility is evaluated. It is deduced that the MF interacts in this area,

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due to this aspect coming into play when the consumer is weighing up the costs and benefits associated with the behaviour. The following are implications of the theory reviewed that are pertinent to influencing choice through MF:

- Self interest or personal consequence has emerged as a key influencer in making SC decisions, indicating that individuals hold their personal status quo as the reference point. Should the message highlight positive personal impact (thereby highlighting personal utility) then prospect theory asserts that the choice made is likely to be a pro-environmental one.
- Timing of benefits is a key element influencing choice, with greater utility gained from a more immediate benefit. Should the message highlight a short term personal gain rather than a long term one then prospect theory asserts that the choice made is likely to be a pro-environmental one.
- Loss aversion is another key influencer. Should the message be framed so as to avoid a loss rather than gain a benefit, prospect theory asserts that the choice made is likely to be a pro environmental one.

The sections that follow detail the use of use of message frames relating to reference dependence (via personal impact), loss aversion and time sensitivity in influencing behavioural intention, and thereby narrowing the KAP gap.

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3. Research Hypotheses

In order to explore if the inclusion of message framing can be used to influence consumption choice within the sustainable consumption arena, the research objectives are combined with the literature reviewed and therefore the following research hypotheses are explored.

3.1. Main effects of the independent variables

Personal impact

The null hypothesis states that the framing of a positive personal impact (PPI) will have no significant difference on the intention to perform a pro-environmental activity (INT) than if no positive personal (NPP) impact is seen. The alternative hypothesis states that a positive personal impact (PPI) will positively influence purchase intention as compared to no positive personal impact (NNP).

$H1_0$: Main effect 'personal impact' is not significant

$H1_A$: Main effect 'personal impact' is significant

Loss aversion

The null hypothesis states that a loss frame (LF) will have no significant difference on the intention to perform a pro-environmental activity (INT) than if a gain frame (GF) is

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used. The alternative hypothesis states that a loss frame (LF) will positively influence purchase intention as compared to a gain frame (GF).

$H2_0$: Main effect 'loss aversion' is not significant

$H2_A$: Main effect 'loss aversion' is significant

Time sensitivity

The null hypothesis states that a long term gain (LT) will have no significant difference on the intention to perform a pro-environmental activity (INT) than if a short term gain (ST) is used. The alternative hypothesis states that a long term gain (LT) will negatively influence purchase intention as compared to a short term gain (ST).

$H3_0$: Main effect 'time sensitivity' is not significant

$H3_A$: Main effect 'time sensitivity is significant

3.2. Interaction effects of the independent variables

The null hypothesis states that there will be no difference in intention to perform a pro-environmental activity (INT) between the various groups of respondents. The alternate hypothesis states that intention to perform a pro-environmental activity (INT) will be higher for those groups that are exposed to a combination of positive personal impact, loss frame and short term gain frames.

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$H4_0$: Interaction effect is not present

$H4_A$: Interaction effect is present

3.3. The interaction between environmental attitude and message frame

The null hypothesis ($H5_0$) states that there will be no impact on behavioural intention as a result of the association between a higher personal utility message frame, that is a personal gain frame (PPI), loss frame (LF) or short term frame(ST), or any combination of these, and a pro-environmental attitude.

The alternative hypothesis ($H5_A$) states that a message frame that communicates higher personal utility, that is a personal gain frame (PP), loss frame (LF) or short term frame(ST), or any combination of these, combined with a pro-environmental attitude (PATT) will more strongly influence behavioural intention.

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4. Research Methodology

4.1. Choice of Methodology

The aim of the research is to test the influence of message framing on consumer choice within the SC setting. In order to establish if a relationship between these variables exists, and to determine the direction of the influences a quantitative approach was necessary.

It has been established that consumer choice is affected by the three characteristics of value evaluation (reference dependence, loss aversion and diminishing sensitivity) in particular patterns respectively (Kahneman *et.al.* 1979; Jones, 2007). This research attempted to establish that these variables, and combinations thereof, affect choice in the sustainable consumption domain in particular directions and used message framing as a means to do so. Combinations of the various value evaluation criteria (the independent variables) were imposed by means of message frames and the effect on behavioural intention (the dependent variable) was noted. The research design used was therefore quantitative and causal in nature.

Zikmund (2003, p56) describes causal research as that which is used to "identify cause-and-effect relationships amongst variables". As explained, in this case the research was designed to determine the relationships (if any) that exist between message framing and consumption choice. Specifically it examined the effect of each independent

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variable (the three value evaluation criteria), as well as the interaction between the variables to see if a specific outcome (choice) is preceded by a particular variable or combination of variables. As the study included the examination of the interaction between three independent variables each of which had different levels at which they could be administered a factorial causal design was used. Zikmund (2003, p283) explains that a factorial design "allows for the simultaneous manipulation of two or more independent variables at various levels". The interaction between the independent variables is important as it accounts for the possibility that the combined effect of two variables may have a different impact on the dependent variable, than if each of the independent variables were changed in isolation (Zikmund, 2003).

Specifically a 2x2x2 factorial design was used, as each of the three independent variables (treatments) had two levels. This design required the use of eight experimental groups, which allowed for each treatment level to be combined with every other treatment level, thereby allowing for the interaction effects between the treatment levels to be measured (Zikmund, 2003). Each group was administered a particular combination of treatment levels, which also allowed for the elimination of the 'transparency' of the decision problem being tested, that is the extent to which the respondent is made aware that the choice process between different frames of the same problem is being evaluated (Takemura, 1994). The different levels of each treatment, as well as the design are shown below in Tables 1 and 2 respectively.

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Table 1: Independent variables with treatment levels

	Independent variable: Reference dependence	Independent variable: Loss aversion	Independent variable: Time sensitivity
Level 1	Positive personal impact (PPI)	Gain frame (GF)	Long term personal gain (LT)
Level 2	No positive personal impact (NPPI)	Loss frame (LF)	Short term personal gain (ST)

Table 2: Tabular representation of research design

	Independent variable: Reference dependence	Independent variable: Loss aversion	Independent variable: Time sensitivity
Cell 1	PPI	LF	ST
Cell 2	PPI	GF	LT
Cell 3	PPI	LF	LT
Cell 4	PPI	GF	ST
Cell 5	NPPI	LF	ST
Cell 6	NPPI	GF	LT
Cell 7	NPPI	LF	LT
Cell 8	NPPI	GF	ST

4.2. Population and unit of analysis

The population of relevance was any individual (adult 18yrs or older) who has joint or full responsibility for his/her household consumption decisions. The filter criterion of responsibility for household consumption was applied as it was assumed that only an individual with this responsibility would be in the position to realistically evaluate the likelihood of purchasing a particular product, or exhibiting a specific 'green' behaviour

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should such an opportunity present itself. The unit of analysis is therefore the individual.

4.3. Sampling

The study made use of a *probability sample, with a simple random sampling* technique. The sampling frame, which was accessed via an independent list provider, consisted of a database of approximately 15 000 middle to senior managers across a cross section of regions and industries in South Africa. Managers were chosen as a proxy for the defined population, as this group of individuals were likely to be of the age and maturity, and sufficiently involved in household decisions to be able to meet the filter criteria (age and household decision making responsibility).

Zikmund (2003) describes simple random sampling as that which ensures that each element in the population has an equal chance of being included in the sample, and notes that the random means by which the sample is selected enables easy analysis of the data and computation of error. The disadvantage to this type of sampling is that the researcher does not necessarily make use of knowledge of the population, resulting in larger errors for the same sample size than if an alternate sampling method such as stratified sampling were used (Zikmund, 2003). Due to the simple random sampling process the sample displays external validity, however this may be tempered by extraneous variables that jeopardise internal validity (for example selection effect) which are discussed in Section 4.7 below.

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Sampling frame

The sampling frame from which the sample was drawn was a mailing list of managers (general, line and 'other' managers) sourced from an independent list provider. Zikmund (2003) notes that the sampling frame might be a list of population elements which differ somewhat from the target population defined, given the unfeasibility of compiling a list that includes all members of the defined population. A discrepancy between the list used and target population represents a source of error associated with the sample (Zikmund, 2003), and it is possible that this phenomenon came into play in this study. The list used was comprised of managers who had opted into the database, and therefore excluded those individuals of this managerial description who would not have been given the option to opt in, or had chosen not to opt in. Sampling frame error (Zikmund, 2003), is therefore present as these individuals were not represented in the sampling frame.

In order to facilitate the research design explained in 4.1 above it was necessary to access the minimum sample size necessary to enable analysis at the level of the sub-samples. Therefore a minimum sample of 240 respondents was required (30 in each experimental group). This design is shown in the Table 3 overleaf.

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Table 3: Sample design

	Combination of Independent variables	Sample size
Cell 1	PPI + LF + ST	30
Cell 2	PPI + GF + LT	30
Cell 3	PPI + LF + LT	30
Cell 4	PPI + GF + ST	30
Cell 5	NPPI + LF + ST	30
Cell 6	NPPI + GF + LT	30
Cell 7	NPPI + LF + LT	30
Cell 8	NPPI + GF + ST	30
Total sample		**240**

Respondents were allocated to each cell by means of a random process; the mailing list was ordered alphabetically by surname, and each of the questionnaires (numbered 1 to 8, and each highlighting one combination of independent variables) were allocated consecutively to the individuals on the list. As explained below, the questionnaires were made available to individuals who when subscribing to the list had indicated their managerial profile as being at general management, line management or 'other management' levels. While the South African living standards measure (LSM) was not tested specifically, the use of managers as respondents, and middle to upper level managers in particular allowed for a similar socio-economic profile of respondents, that is one that was likely to display similar lifestyle characteristics such as degree of urbanisation, ownership of motor vehicles or major appliances. Respondents were requested to provide responses in their personal capacity and not their business capacity.

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4.4. Data collection

A series of eight self completion web-based surveys (hosted on the *QuestionPro* survey hosting website) were used as the collective research instrument. Respondents were invited to participate via a letter of invitation circulated by the independent list provider to the group of potential respondents. The questionnaires were made available to a sample of South African managers; general managers, line managers and 'other' managers from a cross section of ninety five industry types, from all South African provinces, who were contactable via email. All responses were voluntary, and the groups were given a week to respond after which the necessary sample size requirements had been reached, the survey was closed and the measurement tool would capture no further responses.

The following functionality of the *QuestionPro* tool assisted the data collection process:

- Access to the questionnaires was through a simple web-link in the letter of invitation, avoiding complication in being able to access the surveys.
- The tool could capture multiple responses simultaneously allowing the required samples to be collected in parallel within a relatively short period of time.
- Random rotation of the statements on each of the scales was possible, allowing for response patterns and corresponding response bias to be avoided.
- The tool allowed the surveys to be set up to filter and route responses as necessary, and to ensure that questions could not be skipped.

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4.5. Research instrument

The online questionnaire was structured as follows:

Part 1: An introduction that included an orientation to the survey as well as screening questions.

Part 2: Scenarios were used as the medium to test the combinations of treatment levels of the independent variables. Eight scenarios were constructed for this study specifically (though only one was administered in each questionnaire). Liston (2009) notes that much of the communication regarding 'green' choices is not to curtail or stop consumption, but rather to substitute products/actions for more environmentally friendly alternatives. On this basis the scenarios that were constructed described choices for everyday consumption behaviours with which individuals are likely to be faced. Three base scenarios were used across the eight questionnaires; the choice to upgrade a mobile phone, the choice to install a household geyser blanket, and the choice to separate household waste for recycling purposes. Each of these scenarios were then adjusted to communicate the intended message extremity, that is either a gain or loss frame, short or long term gain frame, or personal or non-personal impact frame, while keeping the context and information provided (per base scenario) equivalent. Behavioural intention (or intention to act) based on the scenarios was then measured via a behavioural intention scale.

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Part 3: This section measured perceived environmental knowledge and attitudes, and followed the exposure of the scenario so as to avoid biasing the behavioural intention choice through highlighting knowledge or attitudes. Perceived environmental knowledge was measured using the 'perceived knowledge of environmental issues scale', which has found to be valid and reliable with a high level of internal consistency (a reported Cronbach alpha value of 0.86) (Mostafa, 2007). To test environmental attitudes the newest fifteen item version of the New Environmental Paradigm (NEP) scale (Mostafa, 2007) was used. Versions of this scale have been used to measure environmental attitudes for over two decades, it has been applied across numerous Western and non-Western cultures (Mostafa, 2007) and has been found to be a useful predictor of both reported and observed behaviour (Dunlap, 2008). The latest version of the scale elicits attitudes across five environmental aspects: reality of limits to growth; anti anthropocentrism (that is, rejection of the concept that the human being is the central factor in the universe); the fragility of nature's balance; rejection of the idea that humans are exempt from the constraints of nature; and the possibility of an eco-crisis or ecological catastrophe (Mostafa, 2007). The analysis of results from the new NEP scale has revealed predictive and construct validity in addition to a marginal increase of internal consistency compared to the original scale (Dunlap, Van Liere, Mertig & Jones, 2000). Following the conclusion by Corder (2001) that negatively worded scale items are incorrectly interpreted within the South African context, one item on the new NEP scale was reworded from negative to positive wording.

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Part 4: A section relating to demographic information such as age, gender, race and regional location.

An example of the questionnaire used is available in Appendix 1, while Appendix 2 lists the scenarios that were used in Part 2 of each of the questionnaires.

4.5.1. Pre-testing of the questionnaires

Once developed the questionnaires were tested amongst a small group of conveniently accessible individuals who fit the profile of required respondents. Eight managers at the author's place of work (a large commercial bank) were each asked to pilot one questionnaire. The following changes were made:

- The filter question relating to household decision making responsibility was reworded to remove ambiguity
- The scenarios relating to the upgrade of a cellular contract were modified requesting the reader to assume that his/her current contract was about to expire.

4.6. Data analysis

Various types of data analyses were undertaken as described below.

Descriptive statistics

Descriptive statistics of the sample populations (i.e. number of respondents, race, gender and regional location of respondent) were calculated for the questionnaires, so

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as to enable interpretation and manipulation of the data for analysis. Descriptive statistics were also calculated for the various scales used, so as to understand the orientation of the sample in terms of environmental knowledge and attitude, as well as for the consumption scenarios testing behavioural intention. These statistics are presented in Section 5.1 and 5.3 respectively.

The reliability of scales

As is necessary when using multi-item rating scales, the internal consistency reliability of the various scales was tested using the Cronbach's alpha coefficient (Cronbach's α). The alpha coefficient ranges from 0 to 1, with a value of 0.6 or less indicating unsatisfactory internal consistency reliability (Malhotra, 2004).

The reliability for the total scale is computed and then recalculated with each contributing item of the scale being deleted. If the alpha coefficient increases substantially with the deletion of a particular item, to a value significantly higher than the total scale, then the rule of thumb is to remove that item. The reliability measures for the two scales used are presented in 5.2.

Inferential statistics

Hypotheses 1 to 4 required the comparison of the means of various independent data sets. Factorial multiple analysis of variance (MANOVA) was used to test the main effects of the independent variables as well as the interaction effects between independent variables (Zikmund, 2003).

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Hypothesis 5 required testing the strength of influence of the combination of message frames (nominal independent variables) and environmental attitude (an interval scaled independent variable) on behavioural intention (the dependent variable). The most appropriate means to do so was multiple analysis of covariance (MANCOVA).

The inferential statistics relating to each of the hypotheses are presented in 5.3.

4.7. Research Limitations

The following aspects are limitations to this study:

- Prospect theory is being applied in this study in the context where consumers are asked to assess multiple attributes, for example giving up convenience (of a new mobile phone) and receiving a monetary incentive in return. Thaler (2005) cautions against individuals being able to integrate utilities across multiple attributes.
- It should be noted that the variables measured in this study are not the only aspects that might influence consumer choice in the sustainable consumption domain. Message framing is an aspect that could have an impact, but others may exist that are equally or more influential, for example the level of involvement in the category.
- There is a possibility that sampling frame error is present, as the sampling frame includes only those respondents who opt in to the database. The list might therefore not be representative of the entire population of South African

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managers, but rather those who are open to being contacted electronically for surveys such as this.

- Further errors specifically relating to the method of data collection include:
  - Self selection bias as respondents might choose to answer only if they are interested in the area of sustainable consumption
  - Social desirability bias as respondents might feel the need to choose the 'socially correct' option given social pressure to protect the environment.
- The consumption scenarios used were developed by the author personally. While effort was made to construct scenarios that reflected everyday situations, this process might have been more rigorous through the incorporation of a qualitative phase that tested the relevance, understanding and interpretation of the scenarios used. This would have allowed for the provision for oversights that emerged when the surveys were in field such as respondents already having installed geyser blankets and therefore choosing not to complete the survey, or respondents feeling that an additional two years is too long to wait for a new mobile phone given that modern mobile software deteriorates at such a rapid pace.

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5. Results

This chapter sets out the results obtained from the research undertaken. The format in which the statistics are presented is as follows:

- Introduction and data transformation
- Sample description
- Scale reliability
- Descriptive statistics and hypotheses

5.1. Introduction and Data transformation

In accordance with the research design, eight groups of respondents completed the questionnaires distributed via an independent list provider. The samples required a minimum of 30 respondents in each so as to be statistically viable; for the majority of the questionnaires, slightly more than 30 complete responses were achieved. The questionnaires were closed with 274 responses in total being achieved.

Data transformation

Prior to any analysis the eight sets of data were each 'cleaned' by removing incomplete responses and those individuals who were screened out by the filter questions. In order to facilitate analysis the eight data sets had to be merged. An identifier was allocated to each individual sample to denote the combination of independent

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variables they were exposed to, and each sample was further coded to indicate the type of exposure on each independent variable. The data was then merged to produce one total sample, upon which all the statistics that follow are based.

In addition the following data transformations were performed:

Dependent variable: Behavioural intention

The dependent variable (behavioural intention, assessed through the consumption scenario questions) proved to be non-normal in distribution, exhibiting a strong negative skew. The results of the one sample Kolmogorov Smirnov test shown in Table 4 below indicate a p-value of less than 0.05 proving that the assumption of normality cannot be met.

Table 4: One sample Kolmogorov Smirnov test

One-Sample Kolmogorov-Smirnov Test		
Q3: Behavioural Intention		
N=		**274**
Normal parameters[a,b]	**Mean**	**1.77**
	Std. Deviation	**.827**
Most Extreme Differences	**Absolute**	**.273**
	Positive	**.273**
	Negative	**-.176**
Kolmogorov-Smirnov Z		4.521
Asymp. Sig. (2-tailed)		.000

a. Test distribution is Normal.
b. Calculated from data.

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Levene's test for equality of variances (shown in Table 5 below) was performed to test the assumption that the error variance across the individual samples was equal. The standard in the behavioural sciences is that a p-value of less than 0.05 implies that the variances are not equal. Table 5 shows a p-value of 0.000, and therefore the assumption of equal variance was rejected.

Table 5: Levene's Test of Equality of Error Variances

Levene's Test of Equality of Error Variances[a]			
Dependent variable: Behavioural Intention			
F	**df1**	**df2**	**Sig.**
5.068	7	266	.000
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + RD + LA + TS + RD * LA + RD * TS + LA * TS + RD * LA * TS			

The dependent variable therefore proved to be non-normal in distribution, and did not meet equality of variance. For the purposes of the MANOVA and MANCOVA tests required to test hypotheses 1 to 5, a normal distribution is necessary. Scale transformations were therefore attempted to address the issue of non-normality, but proved to have no impact in meeting normality expectations. However, Hair, Black, Babin and Andersen (2007, p80) state that while "normality can have serious effects in small samples (fewer than 50 cases), the impact effectively diminishes when sample sizes reach 200 cases or more". As such, despite the non-normality and inability to meet equality of variance assumptions, it was decided to maintain the original format

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of the variable for the purposes of all tests in which it was included, and to list the data inadequacies listed above as a limitation to the study.

Independent variables: Environmental knowledge and attitude

For the perceived environmental knowledge and environmental attitude questions summated rating scales were used. Seven items on the environmental knowledge scale were reverse coded, and the two scales were then summated.

For the purposes of interpreting the results, the following guidelines were used:

Environmental knowledge

Good knowledge:	mean score of 3.5 or higher
Average knowledge:	mean score of 3 to 3.4
Poor knowledge:	mean score lower than 3

Environmental Attitude

Pro environmental attitude:	mean score of 3.5 or higher
'Mid' environmental attitude:	mean score of 3 to 3.4
Anti environmental attitude:	mean score lower than 3

Descriptive statistics for both scales are presented in 5.3 below.

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5.2. Sample description

The questionnaires were dispersed to 8750 individuals, of whom 313 responded, representing a response rate of 3.6%. Of those who responded 39 responses were removed due to incomplete questionnaires or not meeting the screening criteria. This left 274 respondents as a final sample for analysis. The minimum sample size of 30 respondents for the individual cells was either met or exceeded for all cells (for reference individual cell counts can be found in Table 10 on page 54.)

The demographics of the respondents at a total sample level are presented in Table 6 overleaf. It should be noted that within certain cells respondents chose not answer demographic related questions. Therefore while these individuals' responses to other questions were included in the rest of the analysis, the number of respondents for demographic data at individual cell level is less than the total number of respondents in some cases.

Within the total sample:

- 59% of men compared to 41% women completed the survey.
- There was a strong skew towards white respondents (75.2%), and towards those aged between 35 and 64 years (81%)
- The majority of respondents were located in the major metropolitan areas of Gauteng, KwaZulu Natal and the Western Cape, with Gauteng accounting for largest proportion of responses (51.9%)

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Table 6: Demographic details of respondents

		Total	
		count	%
Gender	Male	158	59
	Female	110	41
Race	Black	25	9.5
	White	197	75.2
	Coloured	11	4.2
	Asian	5	1.9
	Indian	24	9.2
Age	18 – 24yrs	0	0
	25 – 34 yrs	41	15.3
	35 – 49 yrs	126	47
	50 – 64 yrs	91	34
	65 yrs+	10	3.7
Region	Gauteng	139	51.9
	Limpopo	1	0.4
	Mpumalanga	7	2.6
	KZN	35	13.1
	Free State	2	0.7
	NW Province	5	1.9
	N Cape	0	0
	E Cape	9	3.4
	W Cape	69	25.7
	Outside SA	1	0.4

5.3. Scale Reliability

The construct measures for perceived environmental knowledge and environmental attitude are based on multi-item scales that were chosen because they have previously been used and have demonstrated acceptable reliability and validity. The reliability of the scales measured by Cronbach's α is presented in Table 7 overleaf.

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Table 7: Reliability measures for scales

Measure	Cronbach's α	No. of items
Environmental knowledge	0.857	5
Environmental attitude	0.783	15

The Cronbach's α for the two scales (and the items they are comprised of) were well above the accepted limit of 0.6. For all of the individual samples the deletion of individual items did not significantly alter the reliability scores of the scales, and in most instances the overall score was the highest. Given these results, the scales were used in their original format, that is all items were included, for the purposes of analysing the research hypotheses.

5.4. Descriptive Statistics

The two multi-item scales were averaged (as per the approach used by Mostafa, 2007), that is the average per scale item was calculated. For the purposes of describing the overall level of knowledge or environmental orientation of the individual cells, two summary indexes were calculated for each scale; (1) an overall perceived knowledge index was calculated by averaging the mean scores of the 5 scale items (2) an overall environmental attitude index was calculated by averaging the mean scores of the 15 scale items. The results for these indices at a total sample level, as well as within various demographic variables (where sample sizes were large enough) are presented and discussed below. Additional descriptive statistics are also presented. Given the

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strong skew towards white respondents, the sample sizes for other races were not large enough to permit analysis at race level.

5.4.1. Perceived Environmental Knowledge

Table 8: Descriptive statistics for Perceived Environmental Knowledge

	Count	Summary index (mean)	Std. Dev. of means	Median	Skewness
Total sample	**274**	**3.375182**	**0.8577833**	**3.4**	-0.3563969
Gender					
Male	158	3.364557	0.8679778	3.4	-0.3515349
Female	110	3.416364	0.8208887	3.4	-0.2316266
Age					
25 – 34 yrs	41	3.273171	0.7908933	3.4	-0.1700814
35 – 49 yrs	126	3.407937	0.8848596	3.4	-0.3665527
50 – 64 yrs	91	3.397802	0.8069115	3.4	-0.262453

The results indicate a negative skew in the data, more so for male and 35-49yr old respondents. However using the score interpretation parameters described in Section 5.1 the results indicate that all respondents irrespective of age or gender perceive themselves to possess a level of environmental knowledge which has been interpreted as being average.

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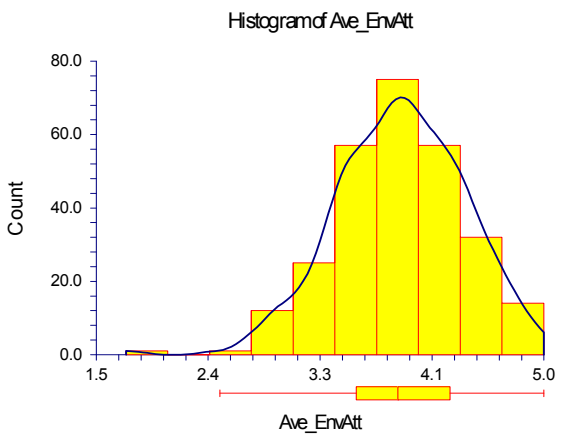
5.4.2. Environmental Attitude

Table 9: Descriptive statistics for Environmental Attitude

	Count	Summary index (mean)	Std. Dev. of means	Median	Skewness
Total sample	**274**	**3.878102**	**0.5069952**	**3.866667**	**-0.3393897**
Gender					
Male	158	3.856118	0.5055122	3.866667	-0.4106472
Female	110	3.904243	0.5162814	3.9	-0.2252912
Age					
25 – 34 yrs	41	3.881301	0.445848	3.8	-7.408975
35 – 49 yrs	126	3.895767	0.5153981	3.866667	-0.1637614
50 – 64 yrs	91	3.902564	0.5069695	3.933333	-0.6226187

Figure 4: Histogram of Environmental Attitude mean scores



The results in Table 9 indicate a negative skew in the data, which is shown again in Figure 4 above. These results could be a result of social desirability bias referred to in Section 4.7 that is, respondents might have felt the inclination to choose a 'socially correct' option given social pressure to protect the environment. The scores indicate an encouraging attitude towards the environment generally, and application of the

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parameters set out in Section 5.1 implies that respondents demonstrated a pro-environmental attitude.

5.4.3. Behavioural intention/Intention to Act

While the influence of the various message frames will be tested via Hypotheses 1 to 4 later in this chapter, an indication of behavioural intention based on the scenarios exposed is provided in Table 10 below. The behavioural intention options across the different scenarios were coded as either 'positive' that is, definitely or probably will act, or 'negative' that is, definitely or probably will not act. Results are shown at a total sample as well as at individual cell level.

Table 10: Descriptive statistics for Behavioural Intention

	Base scenario	Count	Purchase intention/ Intention to act	
			Positive %	Negative %
Cell 1 (PPI + LF + ST)	Mobile upgrade	34	61.8	38.2
Cell 2 (PPI + GF + LT)	Mobile upgrade	38	68.4	31.6
Cell 3 (PPI + LF + LT)	Geyser blanket	34	88.2	11.8
Cell 4 (PPI + GF + ST)	Mobile upgrade	30	56.7	43.3
Cell 5 (NPPI + LF + ST)	Geyser blanket	36	91.7	8.3
Cell 6 (NPPI + GF + LT)	Recycling	39	97.4	2.6
Cell 7 (NPPI + LF + LT)	Geyser blanket	33	87.9	12.1
Cell 8 (NPPI + GF + ST)	Recycling	30	96.7	3.3
Total sample		**274**	**81.4**	**18.6**

Table 10 shows a distinct skew or preference towards the pro-environment choice, that is a positive intention to act (81.4% at total sample level). With this high result it is

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possible that the results might have been influenced by i) social desirability bias mentioned above and ii) the intervention choices themselves, where it is possible that the insulating of geysers for example appeared more impactful in terms of environmental influence, and more effective in terms of cost saving than a delay in mobile phone upgrade.

5.5. Inferential Statistics and Research Hypotheses

In addition to the descriptive statistics presented above, inferential statistics were performed for the purposes of testing the hypotheses proposed in Section 3. The results for these are presented in the sections below.

5.5.1. Main and interaction effects of the independent variables

Hypotheses 1 to 4 were concerned with the effect of the message frame (nominal independent variables imposed via the consumption scenario) on behavioural intention (the dependent variable). In order to compare these effects and determine whether the individual message frames (PPI or NPPI, LF or GF, ST or LT) or a combination of these had a significant effect on behavioural intention, a comparison of the means of the behavioural intention scales between the various data sets was necessary. Given the need to compare the means of multiple groups, factorial multiple analysis of variance (MANOVA) was the most appropriate method to use. This test allows for the testing of the main effects of the independent variables as well as the interaction effects between independent variables, while minimizing the possibility of

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committing Type I error that independent t-tests between the respective samples would have allowed.

Table 11 below provides the statistics relating to the MANOVA. Given that the test involved a single dependent variable, a three way ANOVA test was performed. Hypotheses 1 to 4 are discussed hereafter, with conclusions for each of these hypotheses drawn from this table.

Table 11: Results for Three way Analysis of Variance

Tests of Between-Subjects Effects							
Dependent variable: Behavioural Intention							
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta^2**	**Observed Power[b]**
Corrected model	39.449[a]	7	5.636	10.193	0.000	0.212	1.000
Intercept	857.706	1	857.706	1551.344	0.000	0.854	1.000
RD	26.308	1	26.308	47.583	0.000	0.152	1.000
RA	0.046	1	0.046	0.083	0.774	0.000	0.059
TS	2.394	1	2.394	4.33	0.038	0.016	0.545
RD*LA	8.256	1	8.256	14.933	0.000	0.053	0.971
RD*TS	2.197	1	2.197	3.973	0.047	0.015	0.510
LA*TS	0.159	1	0.159	0.288	0.592	0.001	0.083
RD*LA*TS	0.48	1	0.48	0.868	0.352	0.003	0.153
Error	147.066	266	0.553				
Total	1045	274					
Corrected total	186.515	273					

a. R Squared = .212 (Adjusted R Squared = .191)
b. Computed using alpha = .05

The overall fit of the model may be assessed by interpreting the R-squared component found at the base of Table 11. Here the adjusted R^2 figure (0.191) indicates that this model explains 19% of the variation in dependent variable, which is acceptable in the behavioural sciences.

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The probability that the means across samples are equal is measured by the p-value, which is shown in the column labelled 'Sig' in Table 11 above. The number indicates a probability between 0 and 1, with a number closer to 1 indicating a greater probability that the variances are equal. The standard in behavioural sciences is that a figure below 0.05 indicates a significant difference.

In analysing a multiway ANOVA table Malhotra (2004, p491) states that "it is meaningful to test the significance of main effects only if the corresponding interaction terms are not significant". Using this rule the significance of the interaction terms are evaluated, and a conclusion is drawn on Hypothesis 4 first.

Hypothesis 4:

$H4_0$: Interaction effect is not present

$H4_A$: Interaction effect is present

Table 11 indicates that interaction terms RD*LA and RD*TS are significant as both display p-values less than 0.05 (values of 0.000 and 0.047 respectively). In addition the Partial Eta^2 column gives an indication of the practical significance, that is, the 'size' of the effect. It is necessary to square-root the partial eta^2 figure, and the rule of thumb is that a large effect produces a partial eta (η) of 0.14 or greater, a medium effect produces an η of approximately 0.06, and a small effect produces an η of 0.01. Using this rule it can seen that the interaction RD*LA with a partial eta^2 of 0.053 (and corresponding partial eta of 0.2302) produces a large effect. The interaction RD*TS

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with a partial eta^2 of 0.015 (and a corresponding partial eta of 0.2167) also produces a large effect.

Based on this information it is possible to reject $H4_0$ in favour of $H4_A$ as there is evidence that interaction effect is present for two way interactions between RD and LA as well as RD and TS; however no evidence of a three way effect was present.

Given that the two way interactions have been established as significant, these are discussed in greater detail below.

The interaction between RD and LA

The RD*LA interaction (from the perspective of each of the variables) is depicted by Figures 4a and 4b overleaf, and the relative strength of each of these interactions is discussed thereafter.

In interpreting the interaction charts below and those that follow attention is drawn to the 'estimated marginal mean' denoted on the Y axis of each graph. The axis runs from 1 to 4, and this figure relates to the behavioural intention scales presented within each of the scenarios, where 1 was the most positive outcome ("I definitely will….") and 4 was the most negative outcome ("I definitely will not…..."). Appendix 2 lists the various scenarios as well as the behavioural intention scale used in each. This ordering of the scales is important as it has bearing on the interpretation of the various interaction charts that follow; as the marginal mean increases the 'strength' of the effect actually

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decreases, and given this study's objective of influencing a positive outcome, the lowest score for marginal mean is therefore actually the strongest effect.

Figure 5a: Interaction effect between RD and LA from the LA perspective

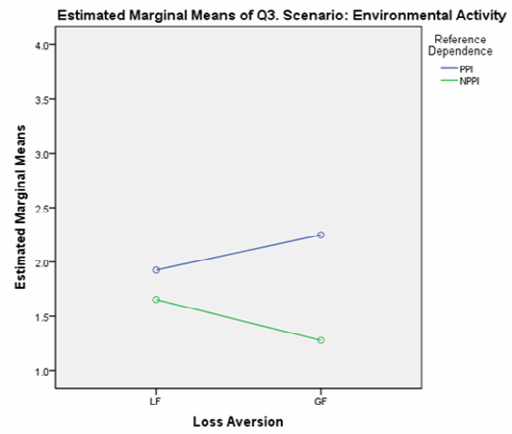
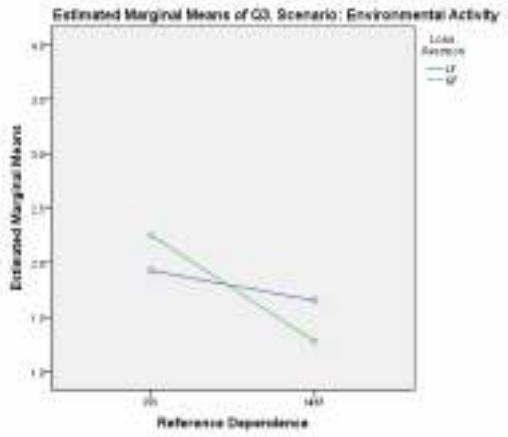


Figure 5b: Interaction effect between RD and LA from the RD perspective



Malhotra (2004) explains that interaction effects vary in strength ranging from ordinal, through disordinal non-crossover, to the strongest disordinal crossover interactions. Ordinal interactions are defined as those for which the rank order of the effects of one variable does not change across different levels of another variable, while disordinal interactions involve a change in rank order of the effects (Malhotra, 2004).

Figure 5a above shows that when RD is framed as a PPI, the highest effect for LA (for this study meaning the <u>lowest</u> score in terms of marginal mean) occurs within a loss frame (LF). However, when RD is framed as a NPPI, the order of LA's effect changes, and the highest effect (again, the lowest marginal mean) now occurs within a gain frame (GF). Figure 5a therefore represents a disordinal non-crossover interaction (Malhotra, 2004).

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Figure 5b shows that when the benefit is framed in a loss frame (LF), the highest effect for RD (lowest marginal mean) occurs within a NPPI frame. When the benefit is communicated in a gain frame (GF), the highest effect for RD (lowest marginal mean) still occurs within a NPPI frame, that is the rank order of the effects does not change. Figure 5b therefore represents an ordinal interaction (Malhotra, 2004).

Given that a disordinal non-crossover interaction 'outranks' an ordinal interaction, the interaction shown by Figure 4a represents the stronger interaction between these two variables.

The interaction between RD and TS

This RD*TS interaction (from the perspective of each of the variables) is depicted by Figures 6a and 6b below, and the relative strength of each of these interactions is discussed thereafter.

Figure 6a: Interaction effect between RD and TS from the TS perspective

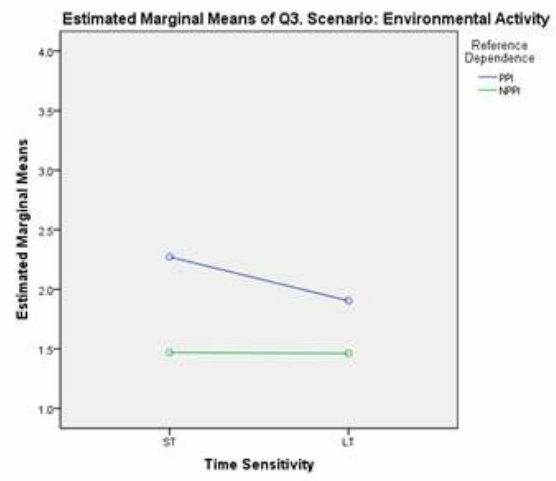

Figure 6b: Interaction effect between RD and TS from the RD perspective

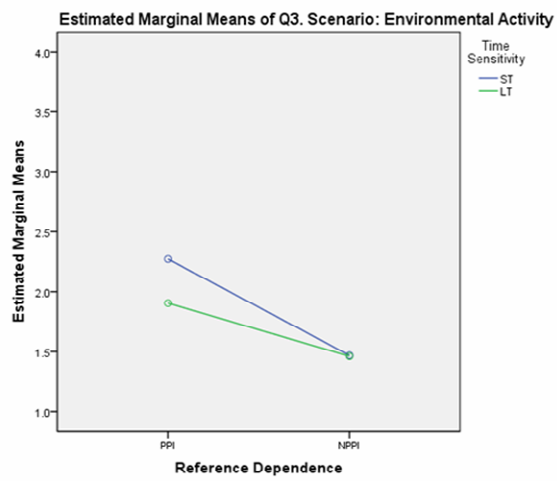

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Figure 6a above shows that when RD is framed as a PPI, the greatest effect for TS occurs when the benefit is in the long term (LT). When the gain is for others (NPPI), TS still has the greatest effect (though only very marginally so) when the benefit is in the long term (LT). No change in rank order effects is present, and Figure 5a therefore represents an ordinal interaction.

Figure 6b shows that when the gain is realised in the short term (ST), the greatest effect for RD occurs when the benefit is for others (NPPI). When the gain is realised in the long term (LT), the greatest effect for RD still occurs when the benefit is for others (NPPI). Once again, no change in rank order effects is present, and Figure 5b also represents an ordinal interaction, that is one of equal 'strength' to Figure 5a.

Conclusions on Hypotheses 1 to 3 will now be drawn.

Hypothesis 1:

$H1_0$: Main effect 'personal impact' is not significant

$H1_A$: Main effect 'personal impact' is significant

The personal impact effect refers to the reference dependence (RD) variable in Table11. Both the interaction terms containing this variable proved significant. Malhotra (1999, p502) states "if the interaction effect is found to be significant, then the effect of [IV1] depends on [IV2] and vice versa. Because the effect of one factor is not uniform, but varies with the level of the other factor, it is generally not meaningful

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to test the significance of the main effects". This implies that we need only turn to main effects where the interaction is not significant. As both the interaction terms containing RD proved significant it is not necessary to interpret the main effect of this variable.

Therefore it is not necessary to reject $H1_0$ in favour of $H1_A$, as the variable does indeed have an effect, but this is mediated through its interaction with a second variable.

Hypothesis 2:

$H2_0$: Main effect 'loss aversion' is not significant

$H2_A$: Main effect 'loss aversion' is significant

The interaction terms containing the loss aversion (LA) variables produce different results. The RD*LA interaction term is significant, while the LA*TS term is not significant (p-value of 0.592). In determining how to proceed, the significance of the RD*LA term must be analysed further. Hair (2006) states that the researcher may proceed to analysing the main effect only if an interaction is deemed to be non-significant, or significant and ordinal. The significance of the RD*LA is term noted, and the discussion of Figure 5a on page 59 has concluded that this is a disordinal non-crossover interaction (Malhotra, 2004) when viewed from the perspective of the LA variable. It is therefore not necessary to interpret the main effect of the LA variable.

Therefore it is not necessary to reject $H2_0$ in favour of $H2_A$, as the variable does have an effect, but this is mediated through its interaction with LA.

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Hypothesis 3:

$H3_0$: Main effect 'time sensitivity' is not significant

$H3_A$: Main effect 'time sensitivity is significant

The interaction terms containing the time sensitivity (TS) variables also produce different results. The RD*TS interaction term is significant, while the LA*TS term is not significant (p-value of 0.592). Using the rule described above, further analysis of the RD*TS interaction is necessary. The discussion of Figure 6a on page 60 has concluded that when viewed from the perspective of the TS variable, the RD*TS term produces an ordinal interaction (Malhotra, 2004). It is therefore possible to interpret the main effect of this variable.

Table 11 indicates that the main effect of time sensitivity (TS) is significant as it displays a p-value of 0.038. In addition with a partial eta^2 of 0.016 (and corresponding partial eta of 0.1264) it can be surmised that TS produces a medium effect on behavioural intention and functions on its own.

Based on this information it is possible to reject $H3_0$ in favour of $H3_A$ as there is evidence that the main effect of TS is significant.

Given that TS functions on its own, the effect of this variable is examined via Figure 7 below, which indicates that it is possible to conclude that a LT frame produces a higher behavioural intention (lower marginal mean) than a ST frame.

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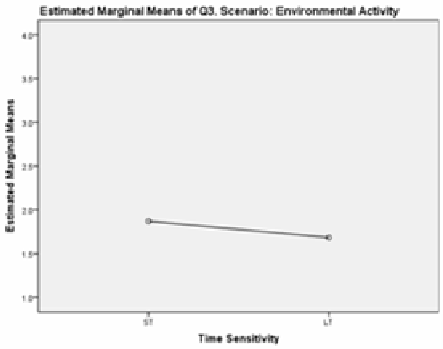
Figure 7: Main effect of Time Sensitivity



5.5.2. Interaction between environmental attitude and message frame

Hypothesis 5 required testing the strength of influence of the combination of message frames (nominal independent variables - factors) and environmental attitude (an interval scaled independent variable – a covariate) on behavioural intention (the dependent variable). Given that the independent variables consist of both categorical (message frames) and metric (environmental attitude) data, the most appropriate means to conduct the test was via multiple analysis of covariance (MANCOVA) (Malhotra, 2004). However as only dependent variable is present, analysis of covariance (ANCOVA) is used.

Hypothesis 5:

$H5_0$: There will be no impact on behavioural intention resulting from a combination of a higher personal utility message frame and a pro-environmental attitude

$H5_A$: There will be impact on behavioural intention resulting from a combination of higher personal utility message frame and a pro-environmental attitude

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Table 12 below provides the statistics relating to the ANCOVA test run, which included the covariate EA (environmental attitude). This test indicates that the same variables are significant, but now includes EA which proves also to be significant (p-value of 0.002, and eta of 0.189 indicating a large effect). Further analysis of the impact of the covariate is necessary.

Table 12: Results for Analysis of Covariance

Tests of Between-Subjects Effects							
Dependent variable: Behavioural Intention							
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**Partial Eta^2**	**Observed Power[b]**
Corrected model	44.707[a]	8	5.588	10.443	0.000	0.240	1.000
Intercept	36.295	1	36.295	67.826	0.000	0.204	1.000
EA	5.259	1	5.259	9.827	0.002	0.036	0.878
RD	23.514	1	23.514	43.941	0.000	0.142	1.000
RA	0.001	1	0.001	0.002	0.969	0.000	0.050
TS	2.041	1	2.041	3.815	0.052	0.014	0.494
RD*LA	8.901	1	8.901	16.633	0.000	0.059	0.982
RD*TS	2.181	1	2.181	4.076	0.045	0.015	0.521
LA*TS	0.250	1	0.250	0.467	0.495	0.002	0.105
RD*LA*TS	0.452	1	0.452	0.845	0.359	0.003	
Error	141.807	265	0.535				
Total	1045.000	274					
Corrected total	186.515	273					

a. R Squared = .240 (Adjusted R Squared = .217)
b. Computed using alpha = .05

As suggested by Hair (2006) a comparison is made between the test excluding the covariate (the results of which are shown in Table 11 on page 56), and the test including the covariate (the results of which are shown in Table 12 above). Hair (2006, p418) states that the inclusion of an effective covariate will "improve the power of the test and reduce within group variance". A comparison is therefore made between the

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power and variance achieved between the old model (Table 11) and the new model (Table 12), and reveals that the observed power between the two remains the same at 1.000, while the new model explains a greater proportion of the variance (error improvement from 147 to 142). This improvement in explained variation of 3.6% is not considered by the researcher to be 'substantial'. The covariate EA is therefore not deemed to be 'effective' and as suggested by Hair (2006) it is acceptable for it to be eliminated.

The implication of this for the hypothesis being tested is that the EA may be eliminated with no significant impact on behavioural intention, as its inclusion had not made a significant difference to the model. With EA being proven as 'ineffective' it follows then that the combination of EA with the other independent variables tested will not have significantly improved the effect on behavioural intention. It is therefore not possible to reject $H5_0$ in favour of $H5_A$.

5.5.3. Summary of findings with respect to hypotheses tested

To conclude, this study tested five hypotheses. Summarised findings are presented in Table 13 overleaf.

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Table 13: Summarised findings of statistical analyses

Hypothesis		Reject H_0 or not
$H1_0$:	Main effect 'personal impact' is not significant	Do not reject $H1_0$
$H2_0$:	Main effect 'loss aversion' is not significant	Do not reject $H2_0$
$H3_0$:	Main effect 'time sensitivity' is not significant	Reject $H3_0$
$H4_0$:	Interaction effect is not present	Reject $H4_0$
$H5_0$:	There will be no impact on behavioural intention resulting from a combination of higher personal utility message frame and pro-environmental attitude	Do not reject $H5_0$

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6. Discussion of Results

6.1. Introduction

This chapter discusses the results presented in Chapter 5. The chapter aims to examine the research hypotheses and statistical outcomes in detail, with the view to answering the fundamental research question "Can message framing be used as a means to influence a sustainable consumption choice?" It does so by attending to each research hypothesis, providing insight into the findings in terms of the context of the study, the literature review, and where relevant the sample. An analysis of the profile of the sample is provided first so as to contextualise the results discussed in the sections that follow.

6.2. Demographics and descriptive statistics

The size of the sample of respondents numbered 274, the result of a completion rate of approximately 88%. On this basis the sample was large enough to undertake analysis, and it can be inferred that the research instrument did not present a challenge to respondents. Attention is drawn to the sampling frame from which the sample was drawn; a list of middle to senior managers across a cross section of regions and industries in South Africa who were contactable via email. This list displays a demographic profile of 75% white, 15% black, 8% indian, and 2% coloured. Sample results for this study have not differed significantly from this profile.

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With respect to the gender of respondents it was evident that there was a slight bias towards male respondents (that is, 59% representation). While gender was not a variable assessed during this study, past research has shown that men exhibit significantly higher perceived environmental knowledge, and concern for the environment in terms of a pro-environmental attitude than women (Mostafa, 2007). An analysis of the descriptive data for the environmental knowledge and environmental attitude variables revealed that the mean scores for these two variables were very similar between men and women. Consequently, gender issues have been treated as not present in this study.

In terms of age and regional profile, the sample produced a distribution that can be expected of a population of middle to senior business managers. Skews towards the metropolitan regions (Gauteng, KwaZulu Natal and the Western Cape) were evident, however these are known to be the business nodes of the country, and Gauteng's prominent representation in the sample is commensurate with the region's profile of dominant economic hub. A skew towards the age group 35-64 years was also evident (81% representation). However, this is to be expected given the job level at which the sample was drawn.

The sample was significantly skewed towards white respondents (75.2% representation). This could be as a result of a number of factors. The profile of the population from which the sample was drawn indicates 75% representation of white respondents. This in itself could represent sampling frame error as discussed in Chapter 4, as the population consists only of those who choose to opt in to the

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database (a particular psychographic profile perhaps). The racial skew could also have been as a result of self selection bias. Roberts, Kivilu and Davids (2010) present evidence of white South Africans being more attuned to environmental sustainability than other races, that is, this race being the most likely to consider environmental related issues as being of priority, have the highest locus of control relating to such issues and have the highest level of concern for the environment. This greater degree of comfort with the topic of sustainability could have resulted in white respondents being more interested, and therefore more likely to respond. Roberts *et.al.* (2010) do note locus of control specifically to be more correlated with income and education than race, and therefore racial skews are less likely to have had an impact from that perspective given the managerial profile of the sample. Nonetheless, the dominant representation of white respondents is noted as a limitation to the study.

Despite the demographic biases noted, the data collected was considered suitable for the purposes of this study. This is further supported by the high Cronbach's α values obtained for both the scales, which emphasised the reliability of the scales used in the research.

6.2.1. Behavioural intention

It has been noted earlier that the behavioural intention scores exhibit a strong skew towards a pro-environmental choice (81.4% positive). This may be attributed to three factors:

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- Social desirability bias where, given the topical nature of the subject matter, respondents might have felt the need to provide a socially acceptable response (despite the anonymity guaranteed in the questionnaires).
- The racial skew in the sample given white respondents' presumed higher predisposition to environmentally friendly behaviour (as implied by Roberts *et.al.*, 2010).
- The type of products/base scenarios selected, where products such as geysers are closely tied to prominent energy concerns and the widely publicised increased costs of electricity.

Also interesting to note is the pattern of the positive responses across the individual cells. As shown in Table 10 on page 54, the cells that exhibited the highest proportion of *negative* responses were cells 1, 2 and 4, despite a positive personal impact message frame (PPI) being common to all of these. These cells were each exposed to a version of the 'mobile upgrade' base scenario. In contrast, the cells exhibiting an overwhelmingly positive response were cells 6 and 8, despite a no positive personal impact (NPPI) frame being common to these. These cells were exposed to versions of the 'recycling' base scenario. While the influence of the base scenario has not been tested in this study, these results provide some indication that the behavioural intention response might be associated to the context of the decision, or to the specific product or action being considered.

Maheswaran *et.al.* (1990) have provided evidence that the level of issue involvement affects the level of detail in which the message is processed, which in turn affects the

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outcome of the message frame. The 'issue' common across all the scenarios was environmental preservation/sustainability. If the level of environmental knowledge and the pro-environmental attitude (each similar across all cells) can be taken to mean a common level of involvement with the issue, then this aspect can be ruled out as the decider in the differing results. It appears that the involvement in the scenario itself has the influence. The mobile upgrade scenarios described behaviour relating to an object more personal to consumers and more integrated into everyday lifestyle than geysers or garbage. So even though the benefit for these scenarios were all personal, the positive response rates differed, potentially as a result of a deeper level of processing involved when considering the scenario itself. While not tested specifically in this study, this notion is congruent with previous research which a) points to the need for specificity of measurement in the SC realm, as attitudes and behaviours may vary across different environmental behaviours (Mainieri *et.al.,* 1997), and b) ties SM success to the explicit acknowledgement of the costs and benefits perceived by consumers in a particular scenario (Bloom *et.al.,* 1981; Alcalay, et.al., 2000).

6.3. Hypotheses 1 to 3 - Addressing the main effects of RD, LA and TS

The first three hypotheses were aimed at determining if the three characteristics of value evaluation (reference dependence, loss aversion and time sensitivity) individually displayed a significant impact on behavioural intention within the sustainable consumption setting. The results for each of these hypotheses will be discussed separately.

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6.3.1. Main effect of Reference Dependence (RD)

Hypothesis 1 was concerned with testing if RD on its own had a significant effect on behavioural intention. The reference point assumed for this study was the status quo, the respondent's current situation/behaviour, as the SC requirement would be for him/her to modify current behaviour in favour of a more environmentally friendly choice. Therefore the reference anchor would be the respondent's personal utility gained from behaving in a particular manner currently (be it upgrading a mobile phone every two years, not insulating a geyser, or not separating household waste).

Kahneman *et.al.* (1979) concluded that the carrier of an attribute's (or behaviour's) value is not its absolute level (the end point), but rather its deviation (gain or loss) from the reference point. Within the current context, and with the reference point having been established as the personal utility derived from current behaviour, it was assumed that the addition or deviation from this personal utility as a result of the proposed behaviour would have an impact on the behavioural intention choice. The levels of the RD independent variable tested were chosen to reflect this impact on personal utility. Positive personal impact (PPI) framed the message in such as way as to communicate a direct positive impact to the respondent him/herself, while doing the right thing for the environment (that is, a positive impact for the environment as well). A 'no positive personal impact' (NNPI) frame showed no direct positive benefit for the respondent, but did deliver on positive impact for the environment. Using the logic developed above the choice that delivered higher personal utility from the base

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reference point should prove to have a greater influence on the behavioural intention choice.

Framing in this manner also allowed for the testing of the argument developed in much of the literature regarding why individuals do not consume/behave sustainably, that is because of consideration being given to both the environmental and personal consequence (Follows *et.al.*, 2000), and because the personal consequence (cost) associated with pro-environmental choice weighs in as a key influence on the decision (Carrigan *et.al.*, 2001; d'Astous *et.al.,* 2009; Poulsen et.al., 2009;). Therefore Hypothesis 1 aimed to test if this reference point (current personal utility) had a significant impact (on its own) on the behavioural intention choice made.

The results of the study do not provide support that RD (personal impact) has a significant effect *on its own*. While the variable does indeed have an effect, this is mediated through its interaction with other variables (either LA or TS). This appears to contradict the implications of previous literature, which has implied that within the SC domain the consideration of personal impact has been a dominant reason why consumers do not exhibit pro-environmental behaviour. However, the interaction with the other independent variables (LA and TS) provides further empirical support for prospect theory itself; that choices under uncertainty are made through the consideration of all three characteristics of value evaluation, though perhaps not all at the same time.

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6.3.2. Main effect of Loss Aversion (LA)

Hypothesis 2 was concerned with testing the effect of loss aversion on its own; the extent to which the choice resulting from a message framed as a loss would differ from one framed as a gain. This aspect of MF (risky choice framing) is the one that has received the most attention in the literature, though it has also produced mixed results in terms of the influence of each (Hanuk *et.al.*, 2003; Grau *et.al.*, 2007).

The results of this study present a contradiction of earlier research where a significant effect of the LA variable was found in varying scenarios, whether it was a gain frame or a loss frame being tested (Ganzach *et.al.*, 1995; Smith *et.al.*, 1995; Rothman *et.al.*, 1997; Berger *et.al.*, 1998; Grau *et.al.,* 2007). The present study shows no significant effect of either frame *on its own*. This contradicting result could be the explained by the complexity of the MF dimensions in this study and that the risk of multiple attributes was being evaluated at the same time. Van't Riet, Ruiter, Werrij, & De Vries (2009) note the consumer's perceived risk, that is how the consumer perceives the choice being made, as a potential moderator in the final outcome. In the mobile phone base scenario for example the social risk of having an outdated mobile phone could be perceived as being greater than the monetary risk of paying more than others. Hankuk *et.al.* (2003) comment that the absence of loss aversion should be expected in certain scenarios, as in multi-attribute scenarios respondents could be displaying a lack of loss aversion for one attribute (price), because they are engaged in loss aversion for another attribute (the latest software on a mobile phone).

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While no empirical evidence has been found here of the effect of LA *on its own*, the variable does display an effect although it is mediated by a second variable, RD. Remembering the stronger disordinal non-crossover relationship between these two variables displayed in Figure 5a on page 59, it appears that within a SC framework the message frame of risky choice produces opposing results, depending on who the beneficiary of the outcome is. This finding is new to the literature and is discussed further under Hypothesis 4.

6.3.3. Main effect of Time Sensitivity (TS)

Hypothesis 3 was concerned with testing the effect of the timing of the gain received, and the extent to which a gain received in the short term (ST) has a different effect from a gain received in the long term (LT). The results achieved provide empirical support for the assertion that TS (on its own) has a significant effect on behavioural intention, though this effect is of medium magnitude. However Figure 7 on page 64 depicts an effect that is unexpected; that within a SC setting a LT frame produces a higher behavioural intention than a ST frame. This contradicts the principle of prospect theory which states that individuals are sensitive to the immediacy of the benefit (Kahneman *et.al.*, 1979). It is surmised that the contradiction in results is related to the context of sustainability generally, where short term benefits are less impressive than the compounded effect of benefits over time. An additional result relating to time sensitivity is that the current study considers the effect of this variable when the other value evaluation criteria are considered at the same time (personal

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impact versus impact for others, and loss frame versus gain frame), and highlights the ability of the variable to produce an effect on its own.

6.4. Hypothesis 4 - Addressing the interaction effects of RD, LA and TS

Hypothesis 4 was concerned with testing whether there is interaction between the three independent variables of value evaluation (RD, LA and TS), that is whether their combined effect on the dependent variable (BI) is greater than the sum of their individual effects.

The results in 5.5.1 provide empirical support that there is interaction between the variables; though evidence of a three way interaction has not been found, evidence for two way interactions between RD and LA, as well as between RD and TS is present. Both these interactions produced large effects. This result proves that the respondents considered more than one variable at a time before making their choice, and implies that consumers' intention to consume sustainably in a particular situation may be increased by addressing elements of either RD and LA, or RD and TS in a communication message. Once again, the consideration of multiple aspects of value evaluation is in support of prospect theory (Kahneman, *et.al.,* 1979), however the greater effect produced by a particular combination of variables is new to the literature. The interactions between each set of variables are discussed in greater detail below.

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6.4.1. The interaction between RD and LA

Given the stronger disordinal non-crossover interaction presented by Figure 5a on page 59, only this interaction will be discussed.

Figure 5a shows that when RD is framed as a PPI, the highest effect for LA occurs within a loss frame (LF), that is, a personal impact benefit is most effective when it is communicated in a loss frame. This result is congruent with prospect theory, that is that losses loom larger than gains (Kahneman, et.al., 1979). When RD is framed as a NPPI, the highest effect for LA occurs within a gain frame (GF), that is, when the benefit is for others, the message is most effective when it is communicated in a gain frame. This result is unexpected, and can perhaps be explained by the notion that when a gain is not for self but for others, consumers are more sensitive to what can be gained and the psychological aspect of what is being lost is not as effective.

To be noted is that the best effects (lowest marginal means) are achieved when the benefit is for others (irrespective of the LA frame), and in fact the best effect in totality is achieved for an 'other' benefit in a gain frame, implying that within a SC setting this combination of variables is the most effective in inspiring behavioural intention. This result, and the generally less effective scores achieved for messages that convey a personal benefit contradict the conclusions drawn by previous authors (Carrigan *et.al.*, 2001; d'Astous *et.al.,* 2009; Poulsen, *et.al.*, 2009) that personal consequence is central to the choice in a SC setting.

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There are important implications of these findings for the social marketer. The emphasis of benefit to others appears to be the most effective mechanism to influence choice, and the use of a gain frame in conjunction with this will produce the best result. The emphasis of benefit to the individual him/herself (PPI) should be a secondary consideration. While the use of a loss frame will produce a better result when combined with a PPI, this will generally not be as effective as if a NPPI frame had been used.

6.4.2. The interaction between RD and TS

Figures 6a and 6b on page 60 show interaction effects of equal 'strength'. When viewed from the perspective of who the benefit goes to, Figure 6a shows that when the benefit is personal (PPI) a long term frame (LT) is the most effective in inspiring behavioural intention. When the gain is for others (NPPI), TS still has the greatest effect (though only marginally so) when the benefit is in the long term (LT). The influence of the long term frame could again be attributed to the possible psychological compounding of benefit within the SC setting put forward 6.3.3 above. To be noted is that the 'for others' frame (NPPI) produces a considerably higher magnitude of effect than a personal impact frame (PPI), irrespective of whether the gain is in the short or long term.

When viewed from the perspective of when the gain is realised, Figure 6b shows that whether this is in the short term (ST) or the long term (LT) the greatest effect occurs when the benefit is for others (NPPI).

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The best effect between the RD and TS variables is found in the interaction between a 'for others' frame (NPPI), irrespective of when the gain is realised, while the worst effect is found when the impact is personal (PPI) and in the short term (ST).

Once again, the implication for social marketers is that when these two variables are considered, the most effective tool in influencing behavioural intention is the use of a non-personal impact frame (NPPI).

6.5. Hypothesis 5 - Addressing the interaction between MF and EA

Hypothesis 5 was concerned with testing the impact on behavioural intention as a result of a combination of personal utility message frames and pro-environmental attitude, with the view to testing if behavioural intention would be higher if a pro-environmental attitude is combined with a message that increases personal utility.

The study found no empirical evidence to support the assertion that there is interaction between MF and EA, and the study's aspiration of proving that MF may be used to translate a positive EA into behavioural intention could therefore not be supported.

Interesting to note however, is that the addition of the variable EA did not produce a significant improvement in the level of claimed behavioural intention, over and above that achieved by the various message frames. This result has implications for the

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debate regarding the relationship between attitude and behaviour within the sustainable consumption context, and appears to support the claims of preceding authors (Gupta *et.al.*, 2009, Tanner *et.al.*, 2003) that a weak relationship exists between an individual's attitude towards the environment, and the environment-related behaviour that the individual exhibits, or in this case claims to intend to exhibit.

6.6. Summary of discussion

The preceding discussion has highlighted a few key points in relation to the effectiveness of message framing in influencing SC choices:

- The framing of messages has been shown to be effective in influencing choice in an SC setting, though the only message frame which exhibits the ability to function on its own is that of TS. Also, of the value evaluation levels that were expected to produce a positive influence on behavioural intention (personal impact, loss frame and short term gain), only LF (loss frame) worked out as expected. It was proven that within the SC context a NPPI (personal impact frame) and LT (long term gain) are more effective than their counterparts in influencing behavioural intention, and therefore the earlier assumption of the need to elevate the personal utility in order to make the sustainable choice more attractive is not supported.
- It has been shown that non-personal impact (gain for others) produces the larger effect (stronger behavioural intention) irrespective of the frame of the other two variables. However it is most effective when combined with either a long term

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frame or gain frame. The study therefore appears to contradict the salience of personal consequence in SC decisions highlighted by other authors (Carrigan *et.al.*, 2001; d'Astous *et.al.,* 2009; Poulsen, *et.al.*, 2009), proving empirically that concern for others is prominent when consumers are faced with a sustainable choice though this variable does function in conjunction with the other two variables.

- The communication of benefits for self does not appear to inspire behavioural intention. While the effect achieved may be manipulated via framing of the other two variables, generally the effect produced when communicating a 'personal' message is not as powerful as when a benefit to others is communicated.
- The combination of message frame and environmental attitude does not produce a better result than the use of the message frame alone.
- A final important point is that there appears to be evidence that behavioural intention is tied to the context within which the decision is made (the scenario) and an understanding of the costs and benefits as they relate to the specific context is key to success.

Given this discussion, conclusions are drawn as to whether the research objectives highlighted in Chapter 1 have been addressed:

- ***Research objective 1*** was concerned with determining if message framing can be used to influence the intention to behave sustainably. As summarised above, the results have provided empirical support that message framing can be used as a tool to influence behavioural intention in a SC setting.
- ***Research objective 2*** was concerned with determining if the combination of message and environmental attitude improves pro-environmental behavioural

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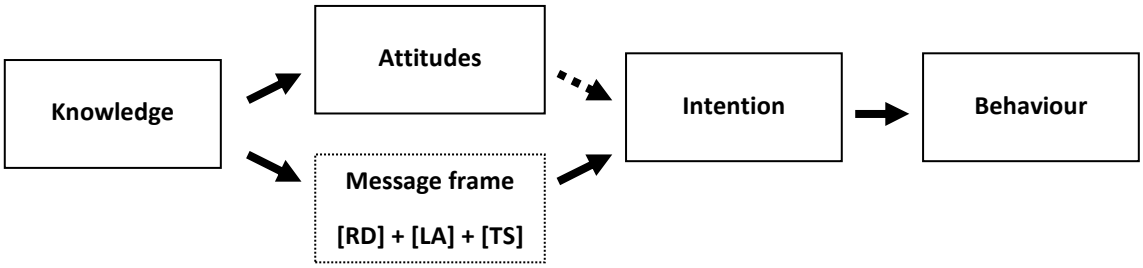
intention, thereby contributing to an understanding of the gap between environmental attitude and behaviour in the SC setting. The results have shown no significant relationship between MF and EA, and therefore message framing which has been central to this study cannot be said to contribute to the narrowing of KAP gap. The study has however contributed to the discussion around the KAP gap itself within SC, by presenting further evidence of a weak relationship between attitudes and behavioural intention in this domain.

Referring back to Figure 3, the Knowledge-Attitude-Intention Behaviour framework portrayed in Chapter 2, this study has not proven the relationship as expected, but instead shows evidence of a different relationship between these elements in the SC setting. This relationship is depicted in Figure 8 below.

Figure 8: Interaction of Message Framing with the KAP gap



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7. Conclusion

The research aimed to test the extent to which message framing could be used to influence sustainable consumption choices, and thereby assist in transitioning a consumer from inaction (despite positive environmental attitude), to action via positive behavioural intention. The study produced mixed results, with some being consistent with the research hypotheses and others that were not. The major findings of the study are discussed below, and the implications of these findings for social marketers are elaborated on. This is followed by the limitations to the study and recommendations for future research.

7.1. Key findings

One of the primary findings confirmed that message framing is indeed a powerful tool available to social marketers to influence sustainable choices. In a domain where the desired outcome is difficult to sell because it is a lot less appealing than its alternative, (self indulgent consumption) (Rothschild, 1999), marketers who have the difficult task of encouraging sustainable behaviours need all the help they can get. Message framing presents a covert mechanism through which choice can be influenced, by appealing to the psychological needs inherent in the choice. Social marketers are able to be cognisant of the means through which utility is assessed within a sustainable consumption choice, and modify the message to highlight those aspects that deliver the greatest utility.

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A second key finding is that the notion of personal consequence being central to the consumption decision (Carrigan *et.al.*, 2001; 'a Astous, *et.al.*, 2009, Poulsen *et.al.*, 2009) is not supported by the results of the present research. The message frame relating to personal impact did not prove to be a significant influence on its own. However the consideration of personal versus non-personal impact is definitely prominent as evidenced by the significant interaction of this variable with the other two. Interestingly the greatest effect in terms of preferred outcome is achieved when a non-personal benefit is highlighted, and the combination of a positive non-personal impact with a level of each of the other two proved to generate the greatest effect in terms of preferred outcome. While contradicting the notion of the centrality of self consequence to the decision, this result has proved that the original tenets of prospect theory, that is that numerous aspects of value evaluation are considered when a decision is made, are relevant within a sustainable consumption context.

A final key finding relates to the influence of environmental attitude on behavioural intention, with the results indicating that a pro-environmental attitude is not a key consideration in the influence of behavioural intention. This result presents a contradiction to previously held consumer behaviour within the SM context, which plot consumer behaviour along a continuum from knowledge, through attitude to behavioural intention, to eventual behaviour (Rothschild, 1999). However, the result adds to the body of literature (Tanner *et.al.*, 2003; Gupta *et.al.*, 2009) that claims a weak relationship exists between these two variables.

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7.2. Recommendations for Social Marketers

The recommendations to social marketing practitioners stem directly from the results discussed:

- The need to fully understand target consumers' assessment of the choice, and the tangible and intangible costs and benefits inherent in the choice is particularly important, as these could vary substantially across different SC behaviours proposed, and significantly influence outcomes as a result.
- Campaigns that will prove most effective would be those that highlight either what society/others stand to gain by the individual's sustainable choice, or what the long term (compounded) benefit to society/others over time would be of a sustainable choice made now. The gain frame would prove the most effective.
- Highlighting positive personal consequences of a decision will not necessarily prove more effective. Where this is a campaign requirement, the most effective means of communicating the benefit would be through a loss frame, where consumers are made aware of what they losing/giving up by not adopting the specific behaviour.

7.3. Limitations of the study

The following limitations are noted within this body of research:

- The data displayed a non-normal distribution for the dependent variable behavioural intention, and this has been attributed to biases such as social desirability bias, the skew towards a possibly more environmentally conscious

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respondent, and the possibility of scenarios themselves exerting an influence given their prominence in the local environment

- The over-representation of white respondents is noted as a limitation due to the possibility that latent pro-environmental attitudes may be present within this group.
- The variation of the base scenario across the different samples is noted as a possible limitation, as this added the possibility for the response to vary as a result of the scenario itself, and potentially clouded the impact of the message frame. Exploring the impact of the base scenario is noted as an area of further exploration below.

7.4. Recommendations for future research

The idea of SM being used as a means through which to attain aggregate sustainable consumption is a new one (Peattie *et.al.*, 2009). Given the importance and social pressure to find solutions to the social problem, the body of literature relating to SM's application in this domain is no doubt likely to grow in the near future. A few recommendations for future research stemming from this study are noted below:

- This study tested claimed behavioural intention based on exposure to hypothetical scenarios. In making these choices the subjects within this study were therefore isolated from their everyday reality. A methodology that tests actual behaviour would prove useful in determining if extraneous variables such as monetary costs

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or inconvenience prove more influential in reality, or if the salience of personal consequence is in fact more prominent when an actual choice is to be made.

- The level of involvement with the product/behaviour, or the specific context within which it is proposed might influence the results received. A methodology that considers the consumer's involvement in the scenario/product/context will reinforce the understanding of the influence of message frames by determining if different levels of processing of the message occurs with different levels of involvement.

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Appendices

Appendix 1 : Sample questionnaire

Section A: Introduction

I am doing research on South African consumers' attitudes towards the environment and their everyday consumption decisions. The purpose of the research is to gain a better understanding of how people make decisions that may affect the environment. To that end you are asked to complete the questionnaire that follows, which should take no longer than 10minutes to complete. Your participation is voluntary and you can withdraw at any time without penalty. Your contact details are not requested, and all other data will be kept strictly confidential. By completing the survey you indicate that you voluntarily participate in this research. If you have any concerns, please contact me or my supervisor. Our details are provided below:

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☐ Proceed to survey
☐ Exit survey

1. Please indicate your age

Younger than 18yrs	1	*Continue*
18 yrs or older	2	*Exit survey*

2. Are you responsible (either fully or jointly responsible) for the household consumption decisions for your household?

Yes	1	*Continue*
No	2	*Exit survey*

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Section B : Consumption scenario

3. Please read through the following scenario and indicate your choice accordingly.

Positive personal impact frame+ Loss frame + Short term gain frame

Mobile phone technology is developing at a rapid rate. As consumers upgrade to newer versions the disposal of old phones in landfill sites causes environmental damage; as the handsets and batteries degrade, they could release toxic heavy metals into the soil and groundwater.

Your cellular service provider has realised that this is an area in which it is able to make an impact. It is offering an incentive to its customers to curb the rate at which they upgrade their phones;

For the duration of the renewed contract, an immediate discount on cellular charges is available to those who choose to renew without taking up a new mobile phone. Those who choose to follow the normal route and upgrade their phone as well will effectively pay up to 25% more on cellular charges than those who don't.

Given this offer, how likely is it that you will renew your contract without upgrading your phone?

I will definitely take up the offer	1
I will probably take up the offer	2
I probably will not take up the offer	3
I definitely will not take up the offer	4

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Section C: Environmental knowledge and Attitudes

4. On a scale of 1 to 5, where 1 is completely disagree and 5 is completely agree, please indicate your level of agreement with the following statements:

	Completely disagree				**Completely agree**
4.1. I know that I buy products and packages that are environmentally safe.	1	2	3	4	5
4.2. I know more about recycling than the average person.	1	2	3	4	5
4.3. I know how to select products and packages that reduce the amount of waste ending up in landfills.	1	2	3	4	5
4.4. I understand the environmental phrases and symbols on product package.	1	2	3	4	5
4.5. I am very knowledgeable about environmental issues.	1	2	3	4	5

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5. On a scale of 1 to 5, where 1 is completely disagree and 5 is completely agree, please indicate your level of agreement with the following statements:

	Completely disagree				**Completely agree**
5.1. We are approaching the limit of the number of people the earth can support.	1	2	3	4	5
5.2. The earth has plenty of natural resources if we just learn to develop them. (R)	1	2	3	4	5
5.3. The earth is like a spaceship with only limited room and resources.	1	2	3	4	5
5.4. Humans have the right to modify the natural environment to suit their needs. (R)	1	2	3	4	5
5.5. Plants and animals have as much right as humans to exit.	1	2	3	4	5
5.6. Humans were meant to rule over the rest of the nature. (R)	1	2	3	4	5
5.7. When humans interfere with nature it often produces disastrous consequences.	1	2	3	4	5
5.8. The balance of nature is strong enough to cope with the impacts of modern industrial nations. (R)	1	2	3	4	5
5.9. The balance of nature is very delicate and easily upset.	1	2	3	4	5
5.10. Human ingenuity will ensure that the earth remains liveable. (R)	1	2	3	4	5
5.11. Despite our special abilities, humans are still subject to the laws of nature.	1	2	3	4	5
5.12. Humans will eventually learn enough about how nature works to be able to control it. (R)	1	2	3	4	5
5.13. Humans are severely abusing the environment.	1	2	3	4	5
5.14. The so-called ecological crisis facing humankind has been greatly exaggerated. (R)	1	2	3	4	5
5.15. If things continue on their present course, we will soon experience a major ecological catastrophe.	1	2	3	4	5

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Section D: Demographics

6. Please indicate your age

18 – 24yrs	1
25 – 34 yrs	2
35 – 49 yrs	3
50 – 64 yrs	4
65 yrs+	5

7. Please indicate your gender

Male	1
Female	2

8. Please indicate your race

Black	1
White	2
Coloured	3
Asian	4
Indian	5

9. Please indicate the region in which you are based:

South Africa - Gauteng	1
South Africa – Limpopo	2
South Africa – Mpumalanga	3
South Africa – KwaZulu Natal	4
South Africa – Free State	5
South Africa – North West Province	6
South Africa – Northern Cape	7
South Africa – Eastern Cape	8
South Africa – Western Cape	9
Outside South Africa (specify country)……	10

End of Survey.

Thank You.

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Appendix 2: Consumption scenarios

Scenario 1 (Cell 1) ***- PPI + LF + ST***

Mobile phone technology is developing at a rapid rate. As consumers upgrade to newer versions the disposal of old phones in landfill sites causes environmental damage; as the handsets and batteries degrade, they could release toxic heavy metals into the soil and groundwater.

Your cellular service provider has realised that this is an area in which it is able to make an impact. It is offering an incentive to its customers to curb the rate at which they upgrade their phones. Assuming your cellular contract is about to expire, consider the following offer;

For the duration of any renewed contract, an immediate discount on cellular charges is available to those who choose to renew without taking up a new mobile phone. Those who choose to follow the normal route and upgrade their phone as well will effectively pay up to 25% more on cellular charges than those who don't.

Given this offer, how likely is it that you will renew your contract without upgrading your phone?

I will definitely take up the offer	1
I will probably take up the offer	2
I probably will not take up the offer	3
I definitely will not take up the offer	4

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Scenario 2 (Cell 2) - PPI + GF + LT

Mobile phone technology is developing at a rapid rate. As consumers upgrade to newer versions the disposal of old phones in landfill sites causes environmental damage; as the handsets and batteries degrade, they could release toxic heavy metals into the soil and groundwater.

Your cellular service provider has realised that this is an area in which it is able to make an impact. It is offering an incentive to its customers to curb the rate at which they upgrade their phones. Assuming your cellular contract is about to expire, consider the following offer;

You have the option to renew your contract now without taking up a new mobile phone. If you do so you will receive a phone double the value of that which you qualify for when your contract comes up for renewal again in two years time.

Given this offer, how likely is it that you will renew your contract without upgrading your phone?

I will definitely take up the offer	1
I will probably take up the offer	2
I probably will not take up the offer	3
I definitely will not take up the offer	4

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Scenario 3 (Cell 3) - *PPI + LF + LT*

South Africa is one of the greatest contributors to global carbon emissions through this country's reliance on coal generated power. With households accounting for almost a fifth of energy consumption there is much opportunity to reduce carbon emissions at a household level through increased energy efficiency.

Electric hot water heaters (geysers) account for approximately 50% of the electricity usage of the average household. However the standard thermal insulation of the average geyser results in considerable loss in heat energy from that geyser every day. Not properly insulating your geyser (via a geyser blanket, available at standard hardware stores) results in up to 15% of your annual household electricity bill literally lost into hot air.

Given this information, how likely is it that you would install a geyser blanket at your home?

I will definitely install a geyser blanket	1
I will probably install a geyser blanket	2
I probably will not install a geyser blanket	3
I definitely will not install a geyser blanket	4

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Scenario 4 (Cell 4) - *PPI + GF + ST*

Mobile phone technology is developing at a rapid rate. As consumers upgrade to newer versions the disposal of old phones in landfill sites causes environmental damage; as the handsets and batteries degrade, they could release toxic heavy metals into the soil and groundwater.

Your cellular service provider has realised that this is an area in which it is able to make an impact. It is offering an incentive to its customers to curb the rate at which they upgrade their phones. Assuming your cellular contract is about to expire, consider the following offer;

You have the option to renew your contract now without taking up a new mobile phone. If you do so you will receive a 25% discount on cellular charges for the duration of the renewed contract.

Given this offer, how likely is it that you will renew your contract without upgrading your phone?

I will definitely take up the offer	1
I will probably take up the offer	2
I probably will not take up the offer	3
I definitely will not take up the offer	4

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Scenario 5 (Cell 5) - ***NPPI + LF + LT***

South Africa is one of the greatest contributors to global carbon emissions through this country's reliance on coal generated power. With households accounting for almost a fifth of energy consumption there is much opportunity to reduce carbon emissions at a household level through increased energy efficiency.

Electric hot water heaters (geysers) account for approximately 50% of the electricity usage of the average household. However the standard thermal insulation of the average geyser results in considerable loss in heat energy from that geyser every day. Not properly insulating your geyser (via a geyser blanket, available at standard hardware stores) results in up to 15% of the energy used to heat your water literally lost to hot air. Aggregating this at a national level over time, 1.5% of the national household energy requirement is wasted through water heating inefficiency, which implies that the carbon emissions required to produce this energy is unnecessary.

Given this information, how likely is it that you would install a geyser blanket at your home?

I will definitely install a geyser blanket	1
I will probably install a geyser blanket	2
I probably will not install a geyser blanket	3
I definitely will not install a geyser blanket	4

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Scenario 6 (Cell 6) - *NPPI + LF + ST*

South Africa generates approximately 100-million kilograms of waste a day, or about two kilograms every day per person. Given the limited availability of landfill sites we are generating more waste than we can handle. The biggest challenge for waste management practitioners is the separation of waste at source, as a large amount of recyclable material ends up in landfill sites.

Your municipal service provider has realised that this is an area in which it is able to make an impact, and is doing so through a pilot recycling project in your neighbourhood. They would like to encourage the separation of waste at a household level, so as to reduce amount of waste going to landfill sites. As part of this project each household will be issued with two bins, one for recyclable materials such as paper and plastic and the other for non-recyclable waste. Waste disposal will be monitored over a three month period. Should there be no significant increase in correctly separated waste during this time the opportunity for broad-scale waste management efficiency would be lost as further funds would not be released to expand the project into other neighbourhoods.

Given this information, how likely is it that you will begin separating your household waste?

I will definitely begin	1
I will probably begin	2
I probably will not begin	3
I definitely will not begin	4

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Scenario 7 (Cell 7) - ***NPPI + GF + LT***

South Africa is one of the greatest contributors to global carbon emissions through this country's reliance on coal generated power. With households accounting for almost a fifth of energy consumption there is much opportunity to reduce carbon emissions at a household level through increased energy efficiency.

Electric hot water heaters (geysers) account for approximately 50% of the electricity usage of the average household. However the standard thermal insulation of the average geyser results in considerable loss in heat energy from that geyser every day. By properly insulating your geyser (via a geyser blanket, available at standard hardware stores) up to 15% of the energy used to heat your water may be saved. Aggregating this at a national level over time, 1.5% of the national household energy requirement might be reduced through water heating inefficiency, implying a reduction in the carbon emissions required to produce this energy.

Given this information, how likely is it that you would install a geyser blanket at your home?

I will definitely install a geyser blanket	1
I will probably install a geyser blanket	2
I probably will not install a geyser blanket	3
I definitely will not install a geyser blanket	4

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Scenario 8 (Cell 8) - *NPPI + GF + ST*

South Africa generates approximately 100-million kilograms of waste a day, or about two kilograms every day per person. Given the limited availability of landfill sites, we are generating more waste than we can handle. The biggest challenge for waste management practitioners is the separation of waste at source, as a large amount of recyclable material ends up in landfill sites.

Your municipal service provider has realised that this is an area in which it is able to make an impact, and is doing so through a pilot recycling project in your neighbourhood. They would like to encourage the separation of waste at a household level, so as to reduce the amount of waste going to landfill sites. As part of this project each household will be issued with two bins, one for recyclable materials such as paper and plastic, and the other for non-recyclable waste. Waste disposal will be monitored over a three month period, and should a significant increase in correctly separated waste be noted, additional funds will be released to roll the project out to other neighbourhoods.

Given this information, how likely is it that you will begin separating your household waste?

I will definitely begin	1
I will probably begin	2
I probably will not begin	3
I definitely will not begin	4

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