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University of Pretoria

## **Hyperbolic Discounting, Organisational Level and MBTI Personality Style in Strategic Decision-Making**

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A research proposal 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 research study was completed to determine whether a relationship exists between executive and senior manager personality styles and the tendency to apply hyperbolic discounting in their strategic decision making.

Experiments were designed to test for hyperbolic discounting when comparing monetary value over time periods, as well as real-life scenarios. An online questionnaire was disseminated to executive and senior management respondents who formed the sample population from the FMCG industry that purported a monetary value experiment, which was based on a previous study done by Chark, Chew, and Zhong (2012), followed by four scenarios with high levels risk and uncertainty. The MBTI scores and organisational level (executives and senior managers) were supplied by the respondents and this was used to compare the MBTI Intuition and Judging personality styles with the respondents answers as per the questionnaires.

The results revealed that when using monetary value comparisons over time the respondents were prone to apply hyperbolic discounting. However, when the scenario questions were analysed there was a diminishing behaviour in the tendency to apply hyperbolic discounting. There was also no significant relationship between the use of MBTI Intuition or Judging between the two organisational levels in strategic decision making. No significance was found in the MBTI personality style and hyperbolic discounting.

Recommendations were made based on the results and what impact it could have for business as well as suggestions on further research.

**KEYWORDS:** Hyperbolic discounting, MBTI Intuition, MBTI Judging, Organisational Level, Strategic Decision-Making

## **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.

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11 November 2013

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# **CHAPTER 1: DEFINITION OF PROBLEM AND PURPOSE**

## **1.1 Definition of Problem**

This study analyses the occurrence of hyperbolic discounting in strategic decision making by senior level managers and whether the personality styles (as defined by MBTI) have an influence. The Fast Moving Consumer Goods industry (FMCG) is examined in this research paper.

Strategic decisions are those decisions made by the executives or senior managers in an organisation (Kelly & Gennard 2007) and are based on future goals. These decisions are established by the company vision and mission and forms part of how the organisation trades within a specific market and/or market conditions. Strategic decision making is the critical component in creating a successful business within the global market (Sadler-Smith & Shefy, 2004).

Many studies have been performed on utility models and none more than the occurrence of discounting as a utility model. Discounting occurs over a time period, also known as intertemporal choices (Berns, Laibson, & Loewenstein, 2007), and a strong focus has been provided on exponential discounting, quasi-hyperbolic discounting and hyperbolic discounting.

Hyperbolic discounting is a method whereby sacrifices are made based on the value of immediate gain/loss and longer term gain/loss (Frederick, Loewenstein, O'Donoghue, 2002). It is unclear how different personality types influence leaders (of a hierarchical nature in corporate structure such as Executives and Senior Managers) and their tendency to apply hyperbolic discounting as a utility model.

The relationship between personality type and strategic decision making stems from Jung's theory regarding behaviour patterns when individuals face different environments or changing conditions within an existing environment (Jung,

1921). Myers and Briggs (Isabel Myers and Katharine Briggs) expanded on Jung's work on personality styles and later founded the Myers Briggs Type Indicator (Cooper, Knotts, McCord & Johnson, 2012) whilst adding on the fourth dimension of judging/perceiving.

Much research has been done on the classification of personality types, leadership within organisational hierarchy and hyperbolic discounting. However, little or no work has been done on how the personality type within an organization's multi-level hierarchy influences the tendency to use hyperbolic discounting as a utility model.

The study title for the proposed research report is therefore: **Hyperbolic Discounting, Organisational Level and MBTI Personality Style in Strategic Decision-Making**

## **1.2 Purpose of the Study**

Hyperbolic discounting is a utility model which is used by certain personality types when faced with long and short term preferences (Frederick et al., 2002) within certain decisions. Strategic decisions are important long term decisions that could possibly be prone to hyperbolic discounting in the face of uncertainty (Andreoni & Sprenger, 2012). The personality types as depicted in the Myers-Briggs Type Indicator are conceptually related to decision making in aspects of how information is gathered and evaluated (Hough & Ogilvie, 2005).

The purpose of the research is to explore the relationship between personality types as depicted by MBTI (Myers-Briggs Type Indicator) and hyperbolic discounting as a utility model at executive levels within organisations in the FMCG industry. The research attempts to determine whether hyperbolic discounting is applied to one common set of situations or if the change in environment/circumstances influences the tendency to apply hyperbolic discounting.

The Myers Briggs Type Indicator has 16 personalities which are formed into four definitive types. For this research only two types; Intuition and Sensing,

Judging and Perceiving, are analysed with strong focus on Intuition and Judgment.

The objective of the research is three-fold. The primary objective is to determine whether hyperbolic discounting exists within the respondent base or sample. The second objective seeks to determine whether the subjects prone to hyperbolic discounting are likely to apply hyperbolic discounting in scenario based circumstances. The third objective is to determine whether personality style/s such as Intuition (N) or Judging (J) are more likely to use hyperbolic discounting and whether it occurs more frequently at a certain hierarchical level in the organisation.

Only two personality styles have been directed in this research. The reason for this direction is that MBTI Perceiving is seen as the preference in the way information is absorbed, with two distinct factors in Intuition and Sensing. The polar opposite of MBTI Perceiving is MBTI Judging which in turn has a preference in the way decisions are made with factors Thinking and Feeling (Hough and Ogilvie, 2005; Francis, Craig, & Robbins, 2007). MBTI Perceiving and Judging are polar opposites and thus the impression that MBTI Intuition is opposite from MBTI Judging in the manner in which information is gathered and a decision is made.

This research hopes to explain whether executives and senior managers with a certain personality style fall victim to hyperbolic discounting when making strategic decisions in different circumstances. The study is set within the FMCG industry and has business relevance. The research is important for business as the FMCG industry is built on working towards long term goals by utilising short term goals. Moreover, the decisions made by leaders have a critical influence in the sales (such as pricing), marketing and supply strategies of commodities (Richards & Pofahl, 2009). Many of the large companies in the FMCG market supply the most basic commodities such as maize, corn, wheat and dairy products which are consumed daily. Concentrating mainly on the food industry (within the FMCG industry), ensures that it is critical to understand what happens when executives or senior managers of large corporations make

strategic decisions and what the impact of those decisions are to retailers and end consumers.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

Strategic decision-making occupies a central role in business and the outcome of these decisions has a real effect on the business (Sadler-Smith & Shefy, 2004). The personality types of hierarchical leaders in a corporate setting, as well as time pressure coupled with the desire for results has an influence on the decisions that leaders make within the organisation. Various models, such as the Vroom and Yetton model, have been designed to assist leaders in the approach and process to decision-making (Margerison & Glube, 1979). Margerison and Glube (1979) explained through their research that those leaders in the organisation, who subjected their direct reports to the structure and process of the model, had higher levels of participation, throughput and satisfaction than those who did not. Jung (1921) found that there exists a strong relationship between personality type and decision making. Hyperbolic discounting is part of the process and outcome of the decision making (Frederick et al., 2002).

This chapter presents theory on the fundamental constructs of this research, namely strategic decision-making and personality style as defined by the MBTI and intertemporal choice, specifically hyperbolic discounting. It also presents organizational level as a critical variable in examining these constructs.

### **2.2 Strategic Decision Making**

Strategic decision making has been a focus area in strategic management literature for many decades (Rahman and De Feis, 2009g). A strategic decision, as defined by Mintzberg, Raisinghani and Theoret (1976, p246) and cited by Eisenhart and Zbaracki (1992), is “important in terms of action taken, the resources committed or the precedents set.” Eisenhart and Zbaracki (1992,

p17) added “That is, we focus on the infrequent decisions made by the top leaders of the organisation that critically affect organisational health and survival”. The CEO and the senior executives are responsible for formulating, integrating and implementing the strategy of the business and thus have a direct impact on strategic decision making (Kelly & Gennard, 2007).

This means that the leaders (executives and senior managers) are the ones who make strategic decisions and that those strategic decisions are critical in the sustainability of the future of the organisation. Strategic decisions thus pave the way of how, where, when, what and with whom the organisation deals and associates with to ensure that it remains valuable to the industry.

Saaty and Vargas (2012) further stated that decision making is best approached from a hierarchical view, as thinking and needs analyses are different at the various levels. They explained that importance of decisions escalates up through the hierarchy and one could thus assume that the lower level decisions are more functional. Strategic decisions then would differ from general functional decisions as the latter could be more tactical, day-to-day operational type of decisions which might not have an impact on the organisation’s overall long term strategy. These decisions are made throughout the entire company from line managers through to functional managers but strategic decisions are predominantly made at board or executive level (Kelly & Gennard, 2007).

The complexity surrounding these decisions within a continuously changing global environment makes the actual decisions and execution important to the future success of the business (Ahmed, Hasnain & Venkatesan, 2012). “Strategic decisions are not made effortlessly and require the use of effective approaches to overcome any potential external and internal challenges. Notably, these techniques are to be used in the appropriate conditions in order to be effective” (Lim, 2011, p30). Modern organisations rely on sound strategic decisions by managers who have a high level of cognitive ability and understand the environment they operate in (Mitchell, Shepherd & Sharfman, 2011). Yet many conditions influence strategic decision making and these can have an impact on the decision making process. External factors such as time pressure, fast-changing environments (Kocher, & Sutter, 2006), uncertainty

(Andreoni, & Sprenger, 2012) and complexity (Mischen, & Jackson, 2008) all lead to a strenuous decision making conditions. These conditions could possibly lead to either over- or under-evaluation of strategic decisions to ensure that the original proposition or hypothesis made by the individual, is still met (Rahman, & De Feis, 2009).

The manner in which strategic decisions are made are critical for the participation of the employees of that organisation and thus organisational health. Frank A. Heller from the United Kingdom wrote "*Managerial Decision-Making: A Study of Leadership Styles and Power Sharing*" in 1971 and identified five styles of managerial decision-making that include the following:

1. The leader makes his own decision alone.
2. Having made his decision alone, the leader adopts a formal method of communicating the result.
3. Prior consultation is used, but the decision rests entirely with the leader.
4. The decision emerges as the result of joint boss-subordinate discussion in which both take an approximately equal share in the final determination.
5. "The leader delegates a decision to his subordinate" (Heller, 1972, p91).

Various types of behaviours and attitudes are present or associated with the type of decision making style (Leykin & DeRubeis, 2010). Consistency is relevant in strategic decision making and the inconsistent judgments made by leaders can have an impact on the direction of the organization (Mitchell et al., 2011). Karelaia and Hogarth (2008, p406) identified that judgment quality is impacted by predictability of the environment, the consistency of the judgment responses and the "matching index" of the environment model to that of the decision maker's model.

Strategic decision making is extremely important in business and places excessive demands on leaders in an organisation and the "fast, high-quality, strategic decision making in this context represents a fundamental dynamic capability in high-performing organizations" (Sadler-Smith & Shefy, 2004, p 76).

## 2.3 Myers-Briggs Personality Styles

The Myers-Briggs Type Indicator is a commonly used questionnaire to measure personality types. Carl Jung, the originator of the theory of personality types, was responsible for the tests discovered out of his work in 1923 and this was continued by Myers and Briggs (Katharine Briggs and Isabel Myers) who were later the founders of the Myers Briggs Type Indicator (Cooper et al., 2012). It was also Myers and Briggs who brought in the fourth dimension of judging/perceiving into the already existing three dimensions (Brown & Reilly, 2009).

The MBTI model was designed according to the principle that differences in behaviour from one person to the next could be categorised as four distinct bipolar opposite types (Behaz & Djoudi, 2012). These four distinct dimensions are Extrovert (E) versus Introvert (I), Sensing (S) versus Intuitive (N), Thinking (T) versus Feeling (F) and finally Judging (J) versus Perceiving (P) which in combination resulted in 16 types of personalities (Behaz & Djoudi, 2012).

These polar opposites are identified in four sets of behavioural preferences which are summarized by Culp and Smith (2009, p66) as follows:

- Where an individual prefers to focus his or her attention and receive energy (Extraversion or Introversion)
- The way an individual prefers to assimilate information (Sensing or Intuition)
- The kind of criteria an individual prefers to use when making decisions (Thinking or Feeling)
- Whether the individual prefers to live in a more structured or a more spontaneous way (Judging or Perceiving)

Sixteen personality types are derived from the behavioural preferences as the eight basic preferences are combined singularly with another in every aspect of the four sets. The typical extrovert (E) will be energized from external sources, the intuitive (N) is a “bigger picture viewer” and assimilates information which fits into that; the thinker (T) will examine the current issues and find solutions by



internally working through information, and finally the perceiver (P) likes to be creative and stays open to new ideas (Culp & Smith 2009). Temperament is seen as a character or a disposition and the four identified distinct natures assimilate with that of the bipolar groups of the MBTI which are traditionalists (S&J), experiencers (S&P), conceptualisers (NT) and idealists (NF) (Culp & Smith 2009).

The MBTI is often used in recruitment processes in companies. Schmidt (1988), as cited by Moutafi, Furnham and Crump (2007), stated that 'psychometric tests have been found to be valid predictors for performance in virtually all jobs, and failure to employ them during selection has been found to lead to substantial economic losses' (Moutafi et al., 2007, p272).

Intuition (N) has been a characteristic that has enjoyed extended prevalence on the decision making agenda and previous research confirms the importance of intuition in business and management as well as the role that executive intuition has on the success of an organization (Dane & Pratt, 2007; Leybourne & Sadler-Smith, 2006; Sadler-smith & Shefy, 2004; Sadler-smith & Shefy, 2007; Sinclair and Ashkanasy, 2005). Olson (1985) stated that intuitive individuals observe cues or signals in unorganized information in a holistic manner but that rational (analytic) individuals are more able to judge and evaluate organized information.

There has been no agreement in what actually defines or constitutes intuition and this disagreement has led to various inconsistent definitions and explanations (Sinclair & Ashkanasy, 2005). Researchers have defined intuition as "a non-sequential information processing mode, which comprises both cognitive and affective elements and results in direct knowing without any use of conscious reasoning" (Sinclair & Ashkanasy, 2005, p357).

This process of unconscious reasoning is often referred to as a gut feel or a sixth sense which is frequently based on previous experience, expertise or prior learning which is either tacit or explicit (Leybourne & Sadler-Smith, 2006; Sadler-Smith & Shefy, 2004). The explicit use of intuition has a direct correlation to the greater experience of leaders and it is evident that it is used more often in

leaders who have had a greater tenure. Sadler-Smith and Shefy (2004, p80) suggested “that the proportion of executives with an intuitive preference is likely to increase with seniority”.

There are certain factors such as culture, masculinity and moral compass that are critical when using intuition, as the process needs to be trusted. This is often tied to the outcome of the decision (Dane & Pratt, 2007).

Sadler-Smith and Shefy (2004) identified that the success of a business within a global competitive environment depends on the intuition of leaders and that this skill is necessary to perfect the faint signals which lead to creative, imaginative and innovative thinking. The authors mentioned above further illustrated that in times of information overload and very tight deadlines, leaders have to make intelligent intuitive decisions or judgments instead of relying on methods which have not yet been invented. They do not imply that intuition is better than rationality or *vice-versa* but that a “rational approach only gives a partial view” (Sadler-Smith & Shefy 2004, p 87).

Improvisation is also related to the intuitive decision making and in itself indicates a level of trust and efficacy in his or her own judgments (Leybourne & Sadler-Smith, 2006). Self-efficacy is reportedly higher with individuals who have an intuitive style of information processing. Of particular importance the level of perception of their own abilities and aptitudes to achieve the goal (Kickul, Gundry, Barbosa, Whitcanack, 2009). Self-efficacy is reportedly higher at certain stages with individuals who have an intuitive style of decision making than those who possess an analytical (judging) style of information processing, and vice versa. However, the level of perception of their abilities and aptitudes to achieve the goal remains important (Kickul et al., 2009).

Ahmed et al. (2012) found that there is a very high correlation between the conceptual, big-picture thinker, decision style and intuitive personality type. Similarly, their findings presented relationships between personality type and decision making style which “...in turn play an important role in a manager’s decision making” (Ahmed, et al., 2012, p27). In turn, their findings on the

judging personality type showed a relation to analytical style of decision making whereby judgers analyse and identify defects before creating a solution.

Gehring (2007) identified that certain traits and personality types such as ENTJ, INTJ and ESTJ are better suited to the competencies needed to support project leadership. There is a definite set of personality types that assist the success of leaders within a certain project and organisations need to ensure that a process or training is designed to ensure the leadership team constitutes the right individuals with the best possible fit for the project.

The concept of intuition training for managers has been researched and there has been little done to invest in the problem-solving skills and intuitive decision making skills of entry level employees (Sadler-Smith & Shefy, 2004, 2007). Reasons for this might be due to the lack of formalized programmes, the difference in cultures in organisations as well as the possibility that leaders frown upon those who do not use data to analyse each and every strategic decision (Sadler-Smith & Shefy 2007). It is imperative that in a rapid changing organizational environment, intuitive decision making receives higher focus and nurturing as it is increasingly more necessary today than ever before (Dane & Pratt, 2007).

Leybourne and Sadler-Smith (2006) found that to be successful as a leader in business, a combination of intuition and judgment is needed to make the best possible decision as analysing data only directs to pathway to certain possible answers but intuition delivers the final decision made.

One needs to understand that a personality type can have Intuition and Judging as well as the polar opposite of Sensing and Perceiving. The degree to what type is preferred over the other (thus strong preference for Intuition over Sensing but slight preference for Judging over Perceiving) plays a significant role and the latter is seen to shift in certain situations (Fornaciari, & Dean, 2012). Fornaciari and Dean (2012) have also stated that over time, an individual can strengthen their bipolar opposite indicator to become more balanced at feeling, thinking, judging and perceiving. It could thus be seen as a constant in

one scenario and a possible variable in another. The Extroversion and Introversion are stronger preferences and these are unlikely to change.

As this study explores the relationship between certain personality styles and strategic decision making, and specifically the role of hyperbolic discounting, literature on intertemporal choice and hyperbolic discounting is now discussed.

## **2.4 Intertemporal Choice and Hyperbolic Discounting**

Intertemporal choices are those decisions that have an impact or outcome over multiple time periods (Berns et al., 2007). Most of the intertemporal choice literature indicates that individuals would rather make the decision to discount an immediate consumption larger than that of longer term consumption. Thus the discount from today until tomorrow will be heavier or larger than that of the discount over a lengthier time period, such as a year. Consumption refers to the actual use or benefit of the reward or utility. The reward or utility could be monetary, percentage savings or even time. This phenomenon in discounting utility is known as Hyperbolic Discounting.

To gain a better understanding of Hyperbolic Discounting it is important to understand Exponential Discounting and Quasi-hyperbolic Discounting. Exponential discounting is the most commonly used discount function in economics, whereby the discount rate is independent on the future horizon. This means that the influences/changes over time do not impact the decision made at present. There exists a level of consistency in the discount function (time or money) which does not change over time periods and thus the larger end result is always concluded to be the best alternative. Subjects would rather take R100 in 13 months' time than R99 in 12 months' time. The fundamental challenge with exponential discounting, however, is that short term discounting is presented at a higher rate than long term discounting. Subjects are more likely to discount higher from today to tomorrow than in 100 days and 101 days from today (Chabris, Laibson, & Schuldt, 2006). This is also known as hyperbolic discounting.

Quasi Hyperbolic discounting as defined by Liabson (1997) occurs over a long period decision (retirement etc.) but it is broken into intermediate time frames between the present and the end period. The intermediate time frames here are important because the discounting happens from one period to another, to the end. This discounting appears where the subject has to rely on himself/herself to make a better decision in the future based on the past decision. In the case of saving over 3 periods ( $A_{today}, B_{3months}, C_{6months}$ ) it is thought that  $B_{3months}$  would make the better decision on saving but in fact it will not due to what  $A_{today}$  would do in the current time. This premise is also valid work for  $C_{6months}$ , as  $B_{3months}$  will assume  $C_{6months}$  will make the best call but is uncertain of that outcome. Effectively, there is a more significant onus placed on  $A_{today}$  to make the better decision now ( $B_{3months}$  will discount higher than  $A_{today}$  and  $C_{6months}$  higher than  $B_{3months}$ ). The character known as  $A_{today}$  would then apply a regulatory future consumption model as it is established that the future self would have different preferences over time (Diamond, & Köszegi, 2003).

Within hyperbolic discounting there is a bias towards present value versus long term benefit and cost and the long term larger reward is sacrificed for the short term smaller, yet immediate, reward (Berns et al., 2007). The longer time horizon plays a stronger role in hyperbolic discounting than the perceived value of the outcome and thus there is a need to separate the perception of value and the perception of delays (Zauberman, Kim, Malkoc and Bettman, 2009)

It often occurs that hyperbolic discounters make conflicting behavioural decisions in terms of their preferences before and after their original decision is made, thus being seen as behaving in a problematic manner (O'Donoghue & Rabin, 1999; O'Donoghue & Rabin, 2000, as cited by Goldin, 2007). Conflicting behaviour could be influenced by such elements as uncertainty, the magnitude of decision and the outcome, the time period at stake, individuals who are prone to high levels of risk-aversion or the magnitude of the future loss (Xia, 2011).

There is a correlation between risk aversion (expected utility) and the personality type (extraversion, intuition, thinking and perceiving) and desired payoff or return (Filbeck, Hatfield & Horvath, 2005). Leaders need to make certain strategic decisions that have consequences because mistakes might

occur, or the environmental conditions might change which make those decisions inappropriate at a later date (Kelly & Gennard, 2007).

“People have difficulty thinking about time as an independent dimension and often misjudge the duration of events, though much of the evidence pertains to retrospective evaluations of duration rather than prospective evaluation of time” (Zauberman et al., 2009, p544). Frederick et al. (2002) explained time discounting as, in a very broad manner, any or all the reasons which lead the future outcomes to be of less or no importance, including causes that reduce the future value of those future outcomes. Rasmusen (2008) also stated that subjects analyse the realist time frame now and put do not place enough focus on the objective time. The objective time is the time in which the end result is measured and thus the time which delivers the larger reward.

The authors mentioned above (Frederick, et al, 2002) furthermore identified implications of time discounting behaviour which are, namely:

- 1.) The magnitude effect model, whereby smaller discounts on larger payoffs are often substituted with larger discounts on smaller payoffs over a time period.
- 2.) The sign affect whereby losses are preferred immediately rather than delaying it.
- 3.) Hyperbolic discounting preference which is defined as “...the preference for immediate utility over delayed utility” and thus the constant rate of diminishing returns (Frederick et al., 2002, p352).

The three implications above are crucial as separate elements but are also found as part or in combination of hyperbolic discounting.

## **2.5 Organisation Levels and Strategic Decision Making**

Stratified systems theory was formulated by Elliot Jaques (1986) and within this theory, aspects such as work, managerial capabilities and the time curves of the complex hierarchical levels within an organization were identified. He further identified that various areas covered by Human Resources (HR) are treated in a

decentralised manner and this could be seen as negative if time-pressured decisions were to be made. It was his aim to combine all these aspects together to create a better HR department that is responsible for ensuring all functions within an organisation are realised. Jaques developed “stratum-specific” systems which would be implemented throughout the business levels, sections, branches and bands of the organization (Jaques, 1986, p236-237). Jaques further focused on developing and strengthening the organisation through equality, trust and empowerment of groups within leadership. This theory provided a new perspective on how organisations are stratified and the various leadership levels that relate to these strata. These leadership or hierarchical levels are used in the study to separate executives, senior managers and general operation staff from one another.

Dionne and Dionne (2008, p229) identified within levels-based leadership that the best manner to “promote the optimization of decisions in hierarchical groups” in an organization, lies within group-based decision making. These could be groups such as board committees, senior managers, functional managers or in smaller organisations the entire managerial group across functions. However, a leadership style which is more participative has an increased ability to succeed in the organization because it then allows for various levels of capabilities amongst employees (Dionne & Dionne 2008). Participative leadership does not necessarily promote the group-focused processes and suggests that the best decisions will then come from those with higher capabilities and aptitudes (Dionne & Dionne 2008).

Buyl, Boone, Hendriks and Matthyssens (2011) identified further that management teams operate better in an environment whereby the head of the organization or Chief Executive Officer (CEO) has a participative approach in decision making. A CEO with a background in marketing, due to the ever-changing dynamic global market, is better suited to working with top management teams than that of a CEO-generalist. This is evident as the generalist CEO’s aptitudes would then render the specialists’ capabilities redundant within the team environment and the decision making process (Buyl et al., 2011).

The literature above states that it is better for strategic decision making to have the right hierarchical structure in place to ensure crisp communication, understanding, clear and cloudless messaging as well as timeous deliverance across all of the top functions.

## **2.6 Conclusion**

The literature review has expressed that strategic decisions are primarily the responsibility of the executives and senior managers in the organisation due to the complex nature of such decisions. These decisions are of vital importance for the sustainability of the organization. Many factors such as uncertainty, risk, self-control and heterogeneity (variations due to characteristics) as well as the impact of intuition and judgment play a part in the decision process (Schuhr, 2009).

Elliott Jaques (1986) stated that complexity is found higher up the organisational hierarchy and this supports the finding that strategic decisions are made by those further along the hierarchical ladder. The personality type and style is directive in how and what decisions are made. The literature supports the MBTI Personality style as descriptive of how subjects are classified by preferences in decision making. Intuition is found higher up the organisational hierarchy due to expertise (intuition could be defined as a mixture of experience and expertise) and the more often it is used can be related to confidence displayed by these leaders (Leybourne, & Sadler-Smith, 2006).

Complexity, uncertainty, risk, time-pressures and personality style are all linked to decision making and these features are all profound in the tendency to apply hyperbolic discounting. Given these views in literature on the relationship between intuition in personality and organizational level, and how this impacts on decision-making, we can ask what the relationship is between intuition and judging personality styles in strategic decisions, and especially how utility models such as hyperbolic discounting affects these decisions. Chapter 3 presents the hypotheses that emerged from the literature review.





## CHAPTER 3: PROPOSED RESEARCH

### 3.1 Research Hypothesis:

The study inspects whether there are any relationships between personality style, organisation level and the use of hyperbolic discounting as a utility model within strategic decision making. Personality styles could differ individually and they have impact on decisions made at various strategic levels of the organization. Discount utility models are ever present with decisions made on outcomes over a time period (intertemporal choices). Thus, this study seeks to understand if there are commonalities between Intuition and/or Judging, senior and executive level and the outcome of strategic decisions through the utility model known as hyperbolic discounting.

The following hypotheses are based on a review of existing literature and are central to the primary research study:

Hyperbolic discounting exists in decisions whereby the subject will forego future gains for immediate gain (Frederick et al., 2002). These gains are typically smaller in measure. Executives and senior managers are further along the hierarchy ladder, where more complexity exists (Jaques, 1986). Strategic decision making is most evident at this level and will encompass the long term future directions of the company. Seeing that long term gains are most important at executive and senior management level, it is hypothesised that:

Hypothesis 1:

***H0: Executives and senior managers are not likely to apply hyperbolic discounting***

***H1: Executives and Senior Managers are likely to apply hyperbolic discounting***

Executives are those people in the organisation who run the sustainable future of the company in their different areas, whereas senior managers run annual plans and operate on month-to-month, week-to-week and day-to-day bases' (Kelly & Gennard, 2007). The organisation's vision would mostly run over a long time period with an end goal and thus decisions need to be made to ensure long term growth. Taking into consideration that strategic decisions and business plans are built for future rewards and that hyperbolic discounting sacrifices long term reward for immediate reward (Frederick et al., 2002), it is hypothesised that:

Hypothesis 2:

***H0: Executives are not more likely to apply hyperbolic discounting than Senior Managers***

***H1: Executives are more likely to apply hyperbolic discounting than Senior Managers***

The literature review demonstrated that there are strong affinities between decision making and personality type. Furthermore the personality styles (as defined by MBTI) and characteristics known as Intuition and Judging play strong roles in the manner in which decisions are made (Ahmed et al., 2012). Intuition in decision making is based on gut-feel and these decisions are made without delay. The opposite of making quick decisions is known as procrastination and this happens when there are delays in rewards (over punishment) or when the task is unpleasant (Steel, 2007). "Intention-action gap" is a known phenomenon found with procrastinators as they tend to act against their original decision/s (Steel, 2007, p70). It is hypothesised that:

Hypothesis 3:

***H0: No relationship exists between MBTI Intuition personality style and hyperbolic discounting***

***H1: A relationship exists between MBTI Intuition personality style and hyperbolic discounting***

Judging personality style in decision making is the personality type that analyses the data and then derives a solution based on the best possible outcome (Ahmed et al., 2012). Seeing as hyperbolic discounting foregoes the best outcome over a period of time, it is hypothesised that:

Hypothesis 4:

***H0: There is no relationship between MBTI Judging personality style and hyperbolic discounting***

***H1 There is a relationship between MBTI Judging personality style hyperbolic discounting***

Personality types and behaviour such as conscientiousness, MBTI intuition and MBTI extroversion have been found to be a more successful personality type for leaders who are higher up in the organisation than those with neuroticism. MBTI introversion and MBTI sensing is less successful in higher positions within an organisation's hierarchy (Moutafi, Furnham & Crump, 2007). Moutafi et al further also explain that MBTI Judging is important in the analytical process of decision and that the preference for MBTI Judging personality style is due to the way in which the decisions are made. Executives and senior managers tend to be only one level apart in the hierarchical ladder and have a direct reporting line. Thus, both are more strategic in thinking than those further down the chain. It is therefore hypothesised that:

Hypothesis 5:

***H0 There is no difference in the use of MBTI Intuition in decision making between executives and senior managers (Organisational Level)***

***H1 There is a difference in the use of MBTI intuition in decision making between executives and senior managers (Organisational Level)***

Hypothesis 6:

***H0 There is no difference in the use of MBTI Judging in decision making between executives and senior managers (Organisational Level)***

***H1 There is a difference in the use of MBTI Judging in decision making between executives and senior managers (Organisational Level)***

## **3.2 Conclusion**

This research paper uses the above hypotheses to reveal whether there are relationships between organisational levels (executives and senior managers), MBTI Intuition, MBTI Judging and the tendency to apply hyperbolic discounting. The research also demonstrates whether executives and senior managers are different in strategic decision making based on their personality styles and if they are prone to hyperbolic discounting.

The six hypotheses are answered through the use of certain methodologies which are discussed in Chapter 4.

# CHAPTER 4: METHODOLOGY AND DESIGN

## 4.1 Introduction

The research design presents the manner in which the research problem is answered. An online questionnaire is the best way to get the information needed as a large sample of executives and senior managers across companies are targeted. The questionnaire is set in two phases whereby the first phase is a previous study (by Chark, Chew and Zhong, 2012) replicated with local characteristics and second phase is real life scenarios based on circumstantial elements and limited information. These scenarios should tap into the behavioural aspects of decision making.

Current literature emphasises the importance of strategic decision making, as well as Intuitive and Rational or Judging personality styles, and the influence of hyperbolic discounting. However, what is required are the accurate descriptions about why these types of leadership styles and decision making occur within an organisation at various leadership levels. The questions of this research report are defined from the theory that exists and thus a deductive approach is pursued. According to Saunders and Lewis (2012, p108) deduction is a research method used when the testing of the theoretical proposition is done through the use of a “research strategy specifically designed for the purpose of its testing”.

Data from the questionnaire allows the researcher to ascertain the link between MBTI personality style (Extrovert/Introvert, Intuition/Sensing, Thinking/Feeling, Judging/Perceiving, with a focus on Intuition and Judging) of executives and senior managers and whether there exists a tendency to use hyperbolic discounting as a utility model. This method allows the researcher to establish whether there is a relationship between MBTI Intuition and MBTI Judging personality styles and if hyperbolic discounting is used as a utility model by one style more than the other.

The reason for focussing only on MBTI Intuition and Judging personality styles is due to the factors depicting the way information is absorbed (Perceiving factors are Intuition and Sensing) and the way decisions are made (Judging factors are Thinking and Feeling), as portrayed in the research by Francis et al., (2007).

A descriptive research study is defined as “research designed to produce an accurate representation of persons, events or situations” (Saunders and Lewis, 2012, p.111). As the study does not focus on new insights or aims to view topics in a new light, as is the case of exploratory studies, it instead seeks to describe situations and personalities within events which lead to quantitative data analysis.

## **4.2 Research Approach**

This study aims to understand the correlation between personality style and the tendency to use hyperbolic discounting as a utility model. More complex decisions happen further along the organisation’s hierarchical ladder (Jaques 1985) and the researcher has focussed on the senior management and executive level of organisations within the FMCG industry. It is also known, from the review of literature from Chapter 2, that intuition is found more regularly in personality types further along the hierarchical structure in the organisation. The greater success could however come from combining both rationality (Judging) and Intuition in decision making.

### **4.2.1 Research Method:**

The quantitative type questionnaires have certain disadvantages such as the level of understanding (clarity) of the questions by the respondents, ambiguity, time limitations and low response rate. Bryman (1988) stated that the use of pilot questionnaires could overcome these challenges. The response rate is critical when using questionnaires and the low response rate often found was perceived as a negative aspect when choosing this method as part of the research methodology (Gray, 2004). However, advantages of questionnaires include cost-effectiveness, low influence from the researcher/interviewer,

geographical dispersion as well as the need to be socially accepted (Jankowitz, 2000). The length of the questionnaire is of extreme importance as an excessively lengthy questionnaire discourages the respondent in focussing on the full task. A short questionnaire is more acceptable (Gillham, 2000) and that ideology was employed in the research.

Qualitative feedback existed in the format of responses in writing from the respondents. This was emphasised as optional and not every respondent felt obliged to provide reasoning for their decisions. This data was seen as secondary and provided insight into what the general feeling was in the scenario based questionnaires. Limited categories were developed for the data and the value of the feedback was assessed based on relevance.

The study followed a mix method and was explained in the following subheadings.

#### *4.2.1.1 Method 1: Replication*

Firstly, a replication of a recent study was administered with changes to only the currency to fit that of South Africa. The research phase commenced with the design of a questionnaire which was based on research done by Robin Chark, Chew Soo Hong and Zhong Songfa at the National University of Singapore in 2012. Their study sought to prove for the tendency to apply hyperbolic discounting in decision making based on monetary reward. The sample was that of students as well as lottery players.

#### *4.2.1.2 Method 2: Scenario based*

Secondly, four scenario based questions were asked which had monetary value and time preference decisions in four separate types of circumstances. The final question in each scenario was an open-ended question that asked for the reason of the decision. This provided the researcher with valuable insight regarding why the respondents made the decisions as there was limited information provided in the questionnaire. The questionnaire was administered via email which was linked to an online site (SurveyMonkey). A dual strategy



was employed by the researcher that allowed for quantitative and qualitative data.

## **4.3 Population and Sampling**

### **4.3.1 The population**

The definition of a population can be described as “the complete set of group members” (Saunders and Lewis 2012, p.132). For this research study, the Fast Moving Consumer Goods industry (focussing mainly on those who supply products within the food sector) was targeted as the population. The FMCG companies have either headquarters (HQ) or regional offices (Business Units) within the borders of South Africa and are spread geographically across the provinces within the country.

### **4.3.2 The sampling procedure**

In order to completely define the sampling procedure, the sample frame, size and method is presented below:

#### **a) Sample frame**

The sampling frame was described by Saunders and Lewis (2012) as a complete list of all members of the population of interest. The targeted respondents were either executive (Director) and senior levels (as depicted in the organisational organogram) within the companies who operate in the FMCG (focussing on consumable products and not the companies who concentrate mainly on non-consumables) industry.

Companies that were targeted were those who supply products and services to the FMCG industry and are all in a similar environmental position when it comes to strategic decision making.

#### **b) Sample Collection method**

A purposive non-probability sampling technique was used since there is not a complete list of the research population and no random sampling was able to be performed. All the organisations are in the FMCG industry but not all the executives and senior managers within the industry are known. The chances of probability of each of the executives or senior managers being selected are not known (Saunders and Lewis, 2012). To ensure the right respondent is chosen a selected profile was set.

### **c) Sample size**

It is important to select a sample size which represents the population of interest in the study. Therefore a sample size of between 30 and 500 were deemed sufficient for a reliable test (Delice, 2010). According to Delice (2010) the researcher must decide on the sample size as per his/her study method to ensure that the data is reliable. For the purpose of this study, the aim is to retrieve in excess of 40 responses per organisational subgroup to ensure a wider scope as well as better understanding of the corporate companies are reached.

## **4.4 Research Instrument**

### **4.4.1 Questionnaire design**

Saunders and Lewis (2012) defined questionnaires as “a general term that includes all methods of data collection in which each person is asked to answer the same set of questions in the same order. Questionnaires can be distributed face-to-face by an interviewer, by telephone, by hand, by post and by the Web” (p141).

Lietz (2010) stated that questionnaires need to be simple and clear and have the targeted population, sample frame and size in mind. Further to this, the questionnaire should be designed well in terms of “focus on current attitudes and recent behaviour” (Lietz, 2010, p265).

#### *4.4.1.1 Questionnaire design: Demographic data*

The demographic data was simply presented in tabulation format. The data displayed the organisational levels between Executives and Senior Managers, the MBTI Intuition and MBT Judging divisions as well a combination of all four of the personality types, namely Intuition, Sensing, Judging and Perceiving (as a respondent could be both Intuitive and Judging). Tables also demonstrated the amount of respondents who were prone to hyperbolic discounting as well as the MBTI personality styles who were prone to hyperbolic discounting.

#### *4.4.1.2 Questionnaire design: Hyperbolic discounting*

Phase one of the questionnaire was built on previous work done by many researchers on the topic of hyperbolic discounting. This research used a questionnaire similar to that utilised by Chark et al. (2012) in the use of monetary value option to test for the tendency to hyperbolic discount.

Phase two was based on four scenarios (each one differs in design) whereby the respondents had three questions to answer based on decisions of value over a time period dedicated. The first two questions were portrayed as an arrangement to conclude with the third question which was a combination of the first two. The third question concluded in an open-ended fashion where the respondents were asked why they chose the value and time frame they did. The latter formed part of the qualitative data research.

#### *4.4.1.3 Questionnaire design: Myers-Briggs Type Indicator (MBTI)*

The MBTI forms part of the questionnaire to depict the personality style of each of the respondents. Thereafter the personality style showed (from the data and testing) whether there was a relationship between MBTI Intuition personality style, MBTI Judging personality style and the tendency for each to apply hyperbolic discounting as a discount utility model.

To ensure that there is a high level of reliability in the research findings it is at times advised to corroborate two or more independent sources of data collection (Saunders and Lewis, 2012). Thus an unstructured interview is a

noble way to solicit responses from respondents to validate the findings of the questionnaires. Sinclair and Ashkanasy (2005, p364 - 365) revealed through their previous work that researchers should rather “supplement questionnaires with other instruments that can cast a more penetrative light over intuition in organizational studies. In this respect, three alternative approaches that may counterbalance some shortcomings of questionnaire measure have been identified:

1. A description of the decision-making process provided by participant;
2. A word-count of description (verbalization); and
3. A measure to the time needed to make the decision (latency)”.

The authors reasoned that these factors should demonstrate the difference between MBTI Intuition and MBTI Judging personality styles when respondents answer the questionnaires. The first two were in the feedback of the qualitative data but no time recording was completed in any of the questionnaires. The reason was that would have limited the responses or would possibly have rushed the respondents to reach decisions without thoroughly thinking about the questions asked.

#### **4.4.2 Pre-testing of the questionnaire**

The sample size chosen for pre-testing was limited to 10 respondents (chosen randomly) and was made up of similar characteristics as seen in the eventual sample frame (Zikmund, Babin, Carr, & Griffin, 2009). Pre-testing of the questionnaire allowed the researcher to ascertain if there were any problems with the design of the questionnaire or the instructions (Zikmund, 2003). The pre-testing does not need a statistical sample size and the results from the 10 chosen respondents showed that the questionnaire and instructions were understood.

The pre-test questionnaire indicated that the questionnaire was concise and that the language was intelligible.

## **4.5 Data Collection**

Various types of questionnaires exist and careful consideration was applied when structuring the questionnaire. In the case of this study the questionnaires were distributed via electronic mail to all the respondents. Before this was done, the respondents received an email or telephonic call to explain the study and were requested to participate. The MBTI scores of each respondent were either retrieved directly from the respondent (as this was on the questionnaire) or permission was requested to retrieve the information from the HR (Human Resources) department who should have had the information. If the respondent was untested for MBTI, he or she was rejected from the study.

Choices type questions were asked as well as a comments section below every third question in the scenarios, to receive data. The closed-ended questions, as is the case with Likert type and two-choices type of questionnaire, facilitated a point count or accumulation to understand the differences from every respondent.

Data was classified into two groups, namely Primary (Hyperbolic discounting and scenario based hyperbolic discounting) and Secondary data (MBTI and organisational level). The primary data retrieved from the questionnaire assisted in recognising hyperbolic discounting as a utility model. The respondents' MBTI scores (focussing on Intuition and Judging personality style indicators) assisted in accessing the secondary data. The organisational level of the respondent formed part of the secondary data and was stated on the questionnaire as either senior management or executive. Respondents who omitted any of the data needed were rejected from the study.

An example of the questionnaire is found in Appendix 1A.

## **4.6 Data Analysis**

There are four different stages before full data analysis is done and included and these are editing, coding data entry and distribution (Zikmund et al 2009). Saunders and Lewis (2012) suggested the use of a spread sheet or an

alternative type of statistical analysis software when analysing sample data quantitatively. The data was coded and then used to type into the chosen format of analysis software. Once this was completed, the data was interpreted to understand the outcome of the various questionnaires.

#### **4.6.1 Data Editing**

The data collected from the questionnaire was subjected to an editing process to ascertain the validity, legibility and levels of consistency. Legibility did not pose any problems as it was an on-line test that was comprehensible. The consistency was checked and all misinterpretations were noted. The researcher did not find any inconsistencies other than respondents not filling in all the information required, thus making their information unusable. Out of the 101 (there were 101 valid entries as per all requirements) valid respondents three were eliminated due to inconsistent responses.

#### **4.6.2 Coding of data and data entry**

Once the data was edited it needed to be coded in numerical values. The numerical values allowed the responses to be allocated / assigned to the designated grouping set. The 'comments' based questions were not coded but used to emphasise any specific theme/s that may emanate from the questionnaire.

The coded data was captured on Microsoft Excel and was subjected to statistical analysis. The statistical tool used was IBM SPSS. Any outliers and the data that fell outside of the normal range of data (Zikmund et al., 2009) was discarded as it became irrelevant by nature.

#### **4.6.3 Normal distribution**

"The symmetrical distribution of data values around the mean for a quantitative variable forming a bell-shaped curve. In a normal distribution the values of the mean, median and mode are the same." (Saunders & Lewis, 2012, p177). The Kolmogorov-Smirnoff test was employed to test for normality.

#### **4.6.4 Correlation**

Once the data was analysed, a correlation between data sets allowed the researcher to understand if there were links, relationships or associations between the different measurements. The associations and reasons for the associations were revealed and allowed the researcher to understand the significance. A significance level ( $p=0.05$ ) was chosen.

### **4.7 Research Limitations**

- Industry

The fast moving consumer goods (FMCG) industry was chosen as a population and thus no other industry was measured. This did not mean that these industries were not subjected to strategic decision making processes, did not have similar personality styles or used different utility models.

- Company/Organisations

Research was limited to the FMCG industry and only those companies within South African borders qualified for participation in the research. Most companies were Multi-National Companies (MNCs) but the study was not solely limited to these companies. Should all respondents be from MNCs, it will be seen as purely co-incidental.

- Demographics

There was no focus on either gender, age or any other demographic representation. The respondents were selected solely from their respective levels within the organisations.

- Researcher's experience

The researcher is employed in the FMCG industry and has experience in strategic decision making. However there was no self-input into any of the results or the design of the outcome.

- Response rate and bias

The researcher sent the questionnaire to more than 250 possible respondents but the response rate was controlled for first 101 valid respondents. This was due to time management of the study. This means that without a significant amount of respondents, a level of bias might occur.

- The limitations of the study were based on “various assumptions” such as changes in personality type and conscientiousness, which might render a “significantly different result” if tested again (Dionne & Dionne 2008, p230).

#### **4.8 Research Ethics**

The researcher guaranteed full anonymity and confidentiality to both the participants and the organisations they represented. None of the information that the researcher received will be disclosed to the organisations as the information might be perceived as sensitive in the organisation or the industry in which they operate. Neither the participating organisations nor the person/s participating in the research project have been named in the research project.

#### **4.9 Conclusion**

This chapter aimed to explain the methodology which was used to meet the objectives of the study. All the aspects were covered and these are all employed to generate answers to the hypotheses as determined in Chapter 3.

The analysis and interpretation is presented in Chapter 5 after the data had been collected and coded.



# CHAPTER 5: RESULTS AND DESIGN

## 5.1 Introduction

This chapter addresses the findings of the data which was collected using the method as described in chapter 4. Hypotheses are written as the null hypothesis, i.e. as the hypothesis of no difference.

The hypotheses which the research aimed to address were:

*H1 Executives and senior managers are not likely to apply hyperbolic discounting*

*H2 Executives are not more likely to apply hyperbolic discounting as a utility model than senior managers*

*H3 There is no relationship between MBTI Intuitive personality style and hyperbolic discounting*

*H4 There is no relationship between MBTI Judging personality style and hyperbolic discounting*

*H5 There is no difference in the use of MBTI Intuition personality style in decision making between executives and senior managers (organisational level)*

*H6 There is no difference in the use of MBTI Judgment personality style in decision making between executives and senior managers (organisational level)*

This chapter analyses the data in terms of the sample size, levels of respondents in the organisation (senior managers and executives), the MBTI in terms of intuition and judgement, the tendency to employ hyperbolic discount and any findings that related to a correlation between all of the above.

## **5.2 Sample Size and Response Rate**

The online survey was sent to 278 potential respondents and was limited to the first 101 valid responses. Seven FMCG companies were approached to complete the questionnaire and a 100% distribution list was delivered. Valid responses were those who entered all the criteria as set for the test, correctly. The valid criteria were organisational level, MBTI and the complete set of answers as provided in the questionnaire. The response rate was thus 101/278 which equates to 36%. The possibility of bias cannot be excluded in the study due to managerial level, personality type or approach to the questionnaire. Three respondents were further excluded on the basis of inconsistent responses.

## **5.3 Characteristics of the Sample**

The Characteristics of the sample emphasise the findings of the initial test for hyperbolic discounting, organisational level (executives and senior managers), MBTI personality style with focus on Intuition and Judging personality styles and the relationship between these constructs.

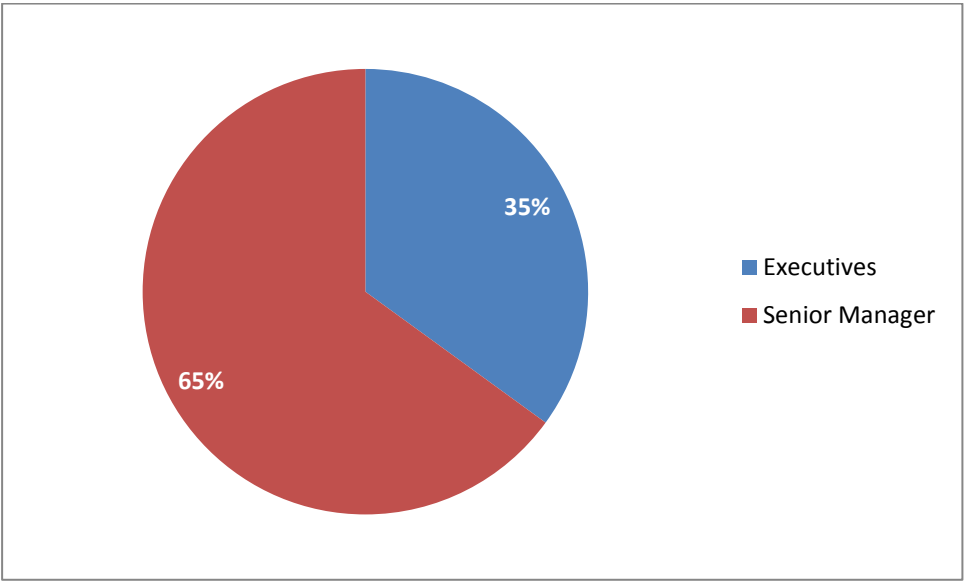
### **5.3.1 Corporate Level**

The focus was at senior manager and executive level as these levels are seen to be more responsible for long term strategic planning. As was identified in Chapter 2, the complexity of decisions increase further along the corporate ladder (Jaques, 1986), hence the decision to select the top two tiers for responses that were based on strategic decision making. Out of the hundred respondents only 34.7% were at executive level and the balance of 65.3% constituted the senior management level (as per Table 1).

**Table 1: Organisational Level**

		Respondents	Percentage
Valid	Executives	34	35
	Senior Managers	64	65
	Total	98	100

**Figure 1: Organisational Level for Executives and Senior Managers**



**5.3.1.1 Executives**

Of the total amount of respondents approached for the study the response rate from executives was low. Only 35% (valid) of total targeted executives responded to the questionnaire. One could thus not exclude a level of bias in the research findings of that from executive personnel.

**5.3.1.2 Senior Managers**

Of the total amount of respondents approached for the study the response rate from senior managers was adequate. A total of 65% (valid) of targeted senior managers responded to the questionnaire.

Note: three of the respondents were excluded from the study as they failed to meet the criteria.

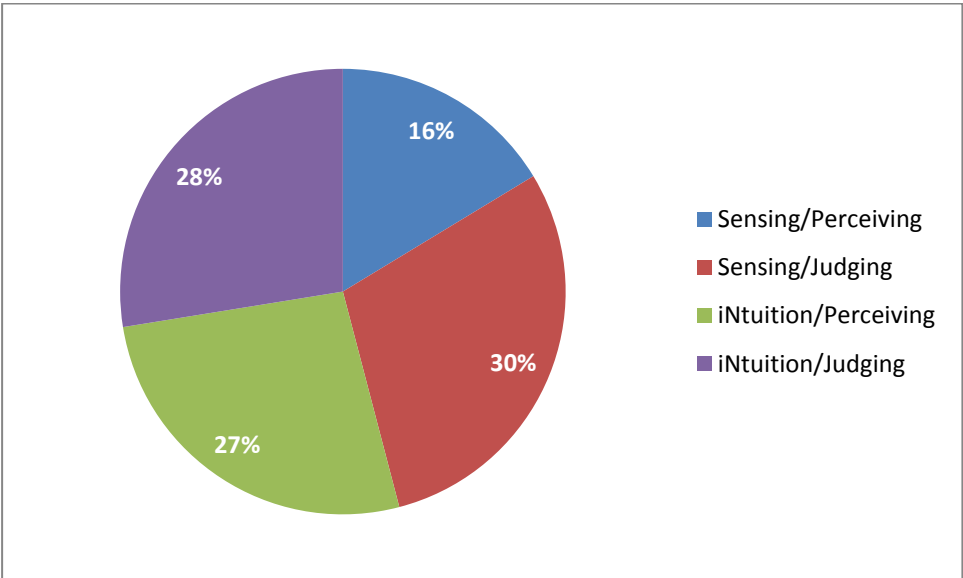
### 5.3.2 Myers-Briggs Type Indicator

The research was solicited based on the MBTI definitions of personality style with the main focus being on Intuition and Judging personality indicators. The polar opposite of Intuition and Judging is evident and needs to be taken into account in the full measure.

**Table 2: Myers-Briggs Type Indicator – Sensing/Intuition/Perceiving/Judging**

MBTI Personality Type	MBTI	
	Respondents	Percentage
Sensing/Perceiving	16	16
Sensing/Judging	29	30
Intuition/Perceiving	26	27
Intuition/Judging	27	28

**Figure 2: MBTI contribution for Sensing/Intuition/Perceiving/Judging combinations**



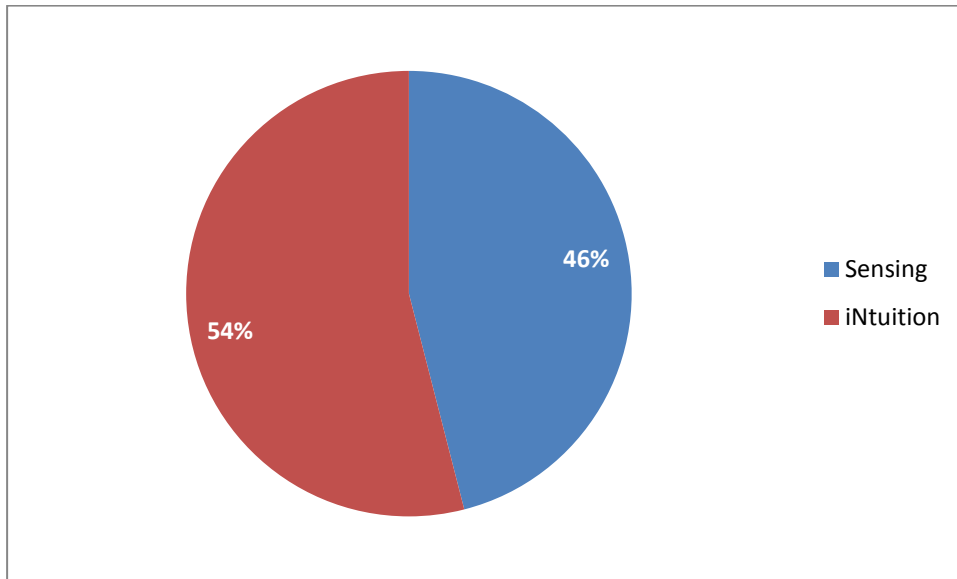
#### 5.3.2.1 Intuition and Sensing

Table 3 below reveals that 54% of the respondents were classified as intuitive by personality style indicators and 46% were defined as sensing.

**Table 3: Sensing/Intuition**

		Respondents	Percentages
Valid	Sensing	45	46
	Intuition	53	54
	Total	98	100

**Figure 3: Respondents for Sensing & Intuition**



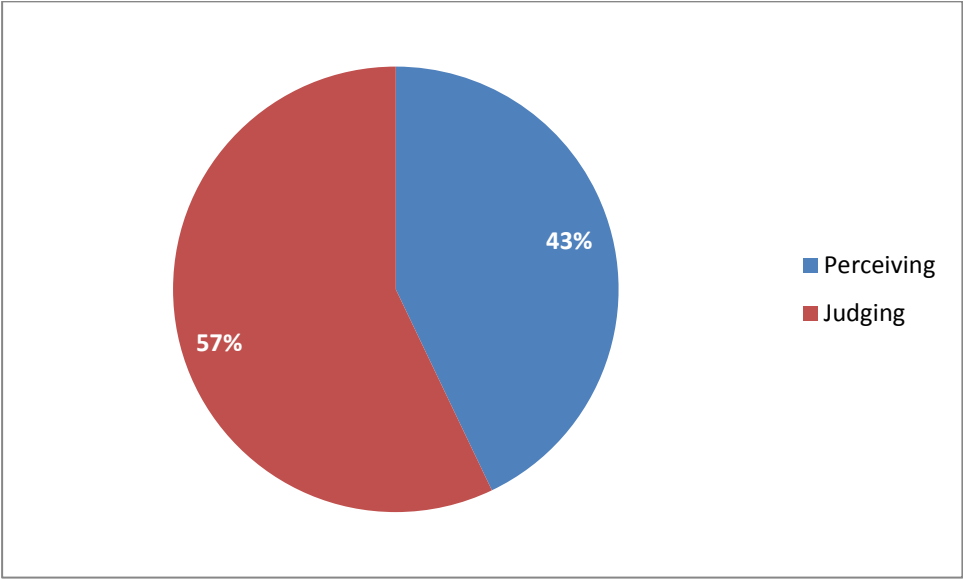
### 5.3.2.2 Judging and Perceiving

Table 4 below expresses that 57% of the respondents were classified as intuitive by personality style indicators and 43% were defined as sensing.

**Table 4: Perceiving/Judging**

		Respondents	Percentage
Valid	Perceiving	42	43
	Judging	56	57
	Total	98	100.0

**Figure 4: Respondents for Perceiving/Judging**



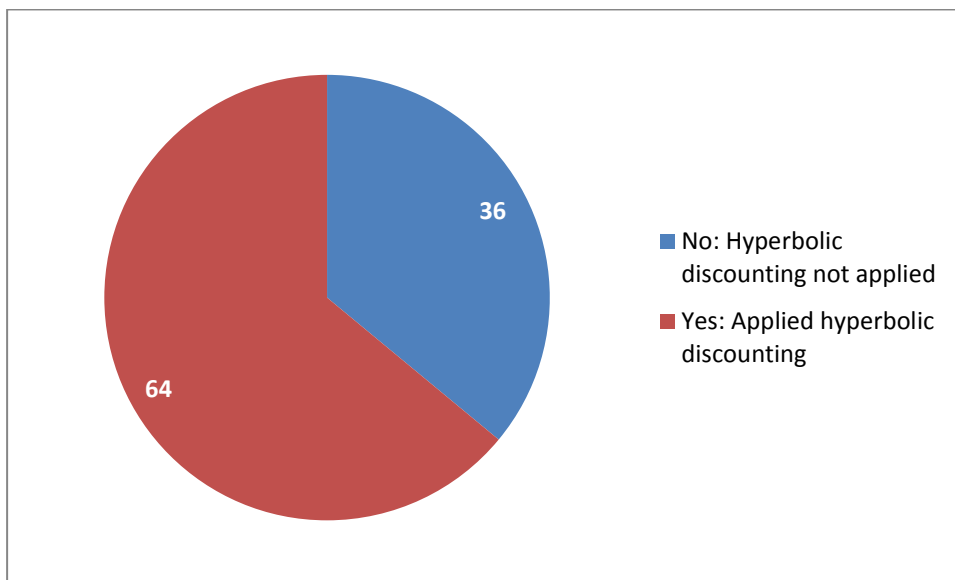
**5.3.3 Hyperbolic discounting**

Table 5 below illustrates that 36% of the 98 valid respondents were not prone to apply hyperbolic discounting. The balance of the respondents (64%) applied hyperbolic discounting from the proximate set of choices (2 and 9 days) to the remote set of choices (301 and 308 days).

**Table 5: Hyperbolic Discounting**

	Hyperbolic Discounters	
	Count	Percent
No: Hyperbolic discounting not applied	35	36
Yes: Applied hyperbolic discounting	63	64

**Figure 5: Tendency to apply Hyperbolic Discounting**



**5.3.3.1 Hyperbolic discounting and MBTI (Intuition and Judging)**

Table 6 and 7 below demonstrates that 46% and 54% of the respondents were Sensing or Intuitive by MBTI personality style respectively. Of the Sensing respondents, 27 (60%) used hyperbolic discounting as a discount utility model and 36 (68%) were Intuitive respondents who tended to hyperbolic discount. Out of the 98 respondents, 43% were Perceiving and 57% Judging. The tendency to employ hyperbolic discount, based on the questionnaires, was evident in 69% (29) of the perceivers and approximately 61% (34) of the judgers.

**Table 6: Hyperbolic discounting and Intuition/Sensing**

Sensing/Intuition	Hyperbolic Discounting		Row Totals
	0	1	
Sending	18	27	45
Column %	51.43%	42.86%	
Row %	40.00%	60.00%	
Total %	18.37%	27.55%	45.92%
Intuition	17	36	53
Column %	48.57%	57.14%	
Row %	32.08%	67.92%	
Total %	17.35%	36.73%	54.08%
Totals	35	63	98
Total %	35.71%	64.29%	100.00%

**Table 7: Hyperbolic discounting and Judging/Perceiving**

Perceiving/Judging	Hyperbolic Discounting		Row Totals
	0	1	
Perceiving	13	29	42
Column %	37.14%	46.03%	
Row %	30.95%	69.05%	
Total %	13.27%	29.59%	42.86%
Judging	22	34	56
Column %	62.86%	53.97%	
Row %	39.29%	60.71%	
Total %	22.45%	34.69%	57.14%
Totals	35	63	98
Total %	35.71%	64.29%	100.00%

### 5.3.3.2 Hyperbolic discounting and MBTI (Intuition/Sensing and Judging/Perceiving)

Intuition and Judging cannot be directly compared, since some people can be both, neither or either. The most inclusive classification is to employ the Sensing/Intuition, Perceiving/Judging variable, which categorises the respondents according to whether they are MBTI Intuition, Judging, neither, or both.

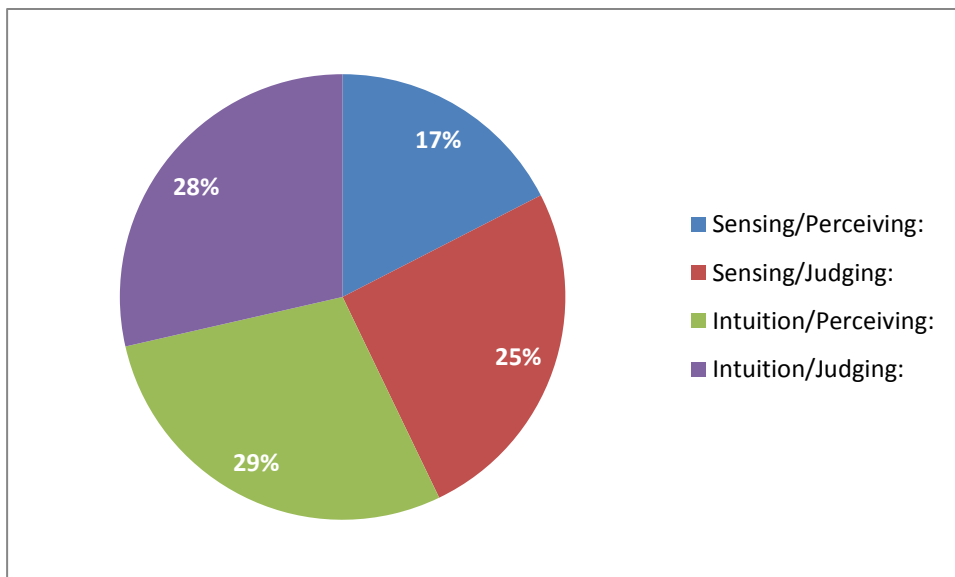
Table 8 indicates the response rate of the total group and the classification of their respective personality style indicators. No measurement was done to define respondents into either Intuition or Judging personality style. The following are the results as found of those sets of personality indicators (Fig 6) and the use of hyperbolic discounting in their decision making:



**Table 8: Hyperbolic Discounting and Sensing/Intuition/Perceiving/Judging**

SNPJ		Hyperbolic Discounting		Row Totals
		0	1	
SP		5	11	16
	Column Percent	14.29%	17.46%	
	Row Percent	31.25%	68.75%	
	Total Percent	5.10%	11.22%	16.33%
SJ		13	16	29
	Column Percent	37.14%	25.40%	
	Row Percent	44.83%	55.17%	
	Total Percent	13.27%	16.33%	29.59%
NP		8	18	26
	Column Percent	22.86%	28.57%	
	Row Percent	30.77%	69.23%	
	Total Percent	8.16%	18.37%	26.53%
NJ		9	18	27
	Column Percent	25.71%	28.57%	
	Row Percent	33.33%	66.67%	
	Total Percent	9.18%	18.37%	27.55%
Totals		35	63	98
	Total Percent	35.71%	64.29%	100.00%

**Figure 6: Personality styles contribution to Hyperbolic Discounting**



Of all the respondents the Intuition/Perceiving and Intuition/Judging contributed the highest percentages of 29% and 28% respectively. Sensing/Perceiving contributed the least amount at 17% and thus are less likely to apply hyperbolic

discounting. There are no other significant differences available for the different groups.

#### **5.4 Phase 1: Hyperbolic discounting (Replication of previous research)**

The replication of the study which was administered by Chark et al. (2012) was designed on a choice system taking into consideration one constant value (R100) on offer in a period of two days, which was then judged to a nine day period with escalating values. The idea was to encourage the respondent to decide what higher value is worth the waiting time of nine days instead of two. This menu was known as the proximate set of choices. There were two further sets of 31 days and 38 days (delayed menu), and 301 days and 308 days (remote set of choices). The respondent had to choose the best value they sought, taking the time frame into account to wait for the money.

The proximate and remote set of choices was chosen for the classification of hyperbolic discounting. To test for the sufficiency it was necessary to test whether the average factors for these menus differ significantly from 1.

Thereafter, it is necessary to test if the discount for proximate menu (two days and nine days) are smaller than discount for remote menu (301days and 308days). The expectation is a significant difference in the discount.

- $\text{Discount}_{2\text{days},9\text{days}}$  is significantly  $<$   $\text{Discount}_{301\text{days},308\text{days}}$

It is essential to test for normality. The Kolmogorov-Smirnov test (Table 10) for normality suggests that  $\text{Discount}_{2\text{days},9\text{days}}$ ,  $\text{Discount}_{31\text{days},38\text{days}}$  and  $\text{Discount}_{301\text{days},308\text{days}}$  are not normally distributed. Significance levels are all below 0.05 which suggests that the null hypothesis is rejected, claiming that data is not normally distributed. A violation of the normality assumption implies that parametric tests are not suitable for use on the current sample. Therefore, there exists a need to rely on non-parametric alternatives.

**Table 9: Tests of Normality**

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
2day – 9day Discount	.134	49	.028	.945	49	.022
301day – 308day Discount	.301	49	.000	.751	49	.000

a. Lilliefors Significance Correction

To test if discount factors differ from 1 (i.e. that some form of discounting has occurred), a Wilcoxon Signed Rank Test was employed (Table 11 and 12 below).

**Table 10 :Test Statistics**

	Subjects – 2day and 9day_Discount
Z	-6.111 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000
Exact Sig. (2-tailed)	.000
Exact Sig. (1-tailed)	.000
Point Probability	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

**Table 11 Test Statistics**

	Subjects – 301day and 308day _Discount
Z	-4.233 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000
Exact Sig. (2-tailed)	.000
Exact Sig. (1-tailed)	.000
Point Probability	.000

a. Wilcoxon Signed Ranks Test

b. Based on Negative ranks

The resulted tests demonstrate that with the p-value of 0.000 there is sufficient evidence to suggest that the observed discount factor is significantly different from 1, which implies that discounting has occurred. It is needed to test the remote menu from proximate menu (301 days and 308 days from two days and nine days) and for that the Wilcoxon Signed Rank Test is again used.

**Table 12: Test Statistics**

	301days & 308days Discount from 2days & 9days Discount
Z	-6.099 <sup>b</sup>
Asymp. Sig. (2-tailed)	.000
Exact Sig. (2-tailed)	.000
Exact Sig. (1-tailed)	.000
Point Probability	.000

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

The result test shows a p-value of 0.000 and thus shows sufficient evidence to suggest that the observed discount factor for proximate menu of two days and nine days is significantly different from remote menu 301 days and 308 days, which implies that hyperbolic discounting has occurred.

The percentage of respondents who applied hyperbolic discounting amounted to 64%. When comparing this to the test by Chark et al. (2012), the respondents differ as 64 and 98 respectively; it differs significantly as their study found “Hyperbolic discounters make up 28%, 20%, and 9% in the comparisons of Menu 1 – Menu 2, Menu 1 – Menu 3, and Menu 2 – Menu 3 respectively” (Chark et al., 2012, p18). The menus compared are proximate to remote (Menu 1 – Menu 3) which emphasises only 20% in their study versus 64% in this research study.

## **5.5 Phase 2: Scenario Based Questions and Hyperbolic Discounting**

### **5.5.1 Introduction:**

Phase 1 of the research, as mentioned, was pure numerical testing for hyperbolic discounting within three sets of questions. The outcome exhibited that 64% of all executives and senior managers tended to apply hyperbolic discounting when faced with choices of monetary value over a specified time frame. What is however unclear is if the same pattern or tendency to apply hyperbolic discounting will emerge in scenarios which are more complex in nature.

### **5.5.2 Scenario based Hyperbolic discounting**

Hyperbolic discounting is seen as circumstantial based on outcomes and forces within play. It is more often evident and as more easily measurable in situations such as dieting and saving for retirement (Newhouse, 2006).

Similar tests were run to identify if hyperbolic discounting was evident in the “scenario based” questions. The questions were designed to understand whether hyperbolic discounting happens in variable circumstances. The 1<sup>st</sup> and 2<sup>nd</sup> question arranged the construction of the formulation for a possible discounting utility in question three. The respondents were allowed to choose only one answer per question.

This also provided the opportunity to observe whether a level of quasi-hyperbolic discounting occurs, albeit that no detail will exist on this topic in the research. The circumstances included bonus allocation, pressure selling environment of a high quality product, acquisition of a company that is performing well whilst financing the deal and finally, acquiring an ailing company with a similar financing deal. All the scenarios were bounded by a time frame. The following are the findings:

#### *5.5.2.1 Scenario one: Reward based*

The reward based question had the following choices:

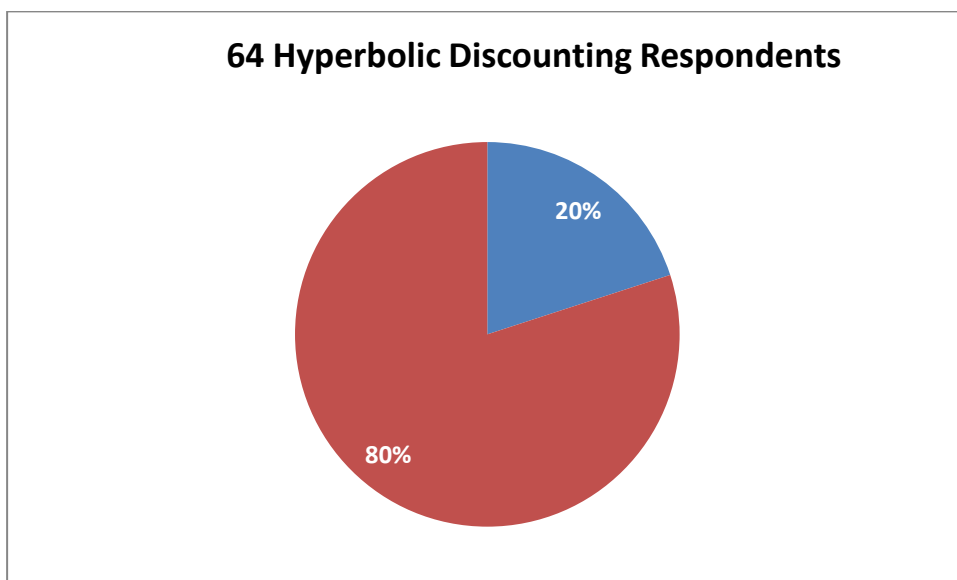
Q1: R50,000 today or R60,000 in a month

Q2: R100,000 in 12 months or R120,000 in 13 months

Q3: R50,000 today or R60,000 in a month or R100,000 in 12 months or R120,000 in 13 months.

Only 17% of the respondents tended to use hyperbolic discounting as a utility model from the full sample. As a statistic this is insignificant. From the 64 identified hyperbolic discounting respondents (as per Table 6 in this study) only 20% (Figure 7) used hyperbolic discounting as a utility model when faced with this reward based scenario.

**Figure 7: Response rate for defined Hyperbolic Discounting Respondents**



#### 5.5.2.2 Scenario two: Selling under pressure

The selling stock of high value items under pressure had the following choices:

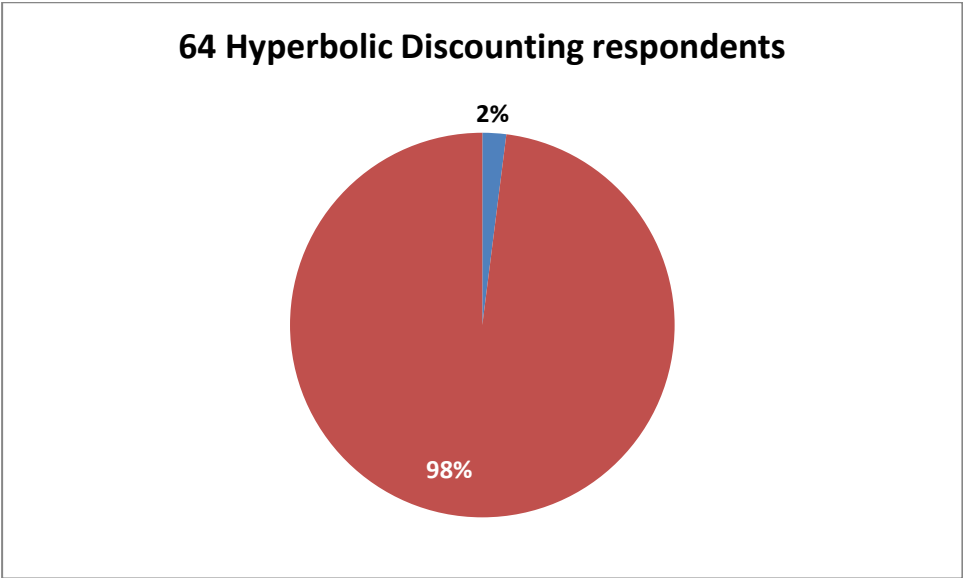
Q1: 20% discount today or 10% in a month

Q2: 5% in 12 months or 2.5% in 13 months

Q3: 20% today or 10% in a month or 5% in 12 months or 2.5% in 13 months.

Only five percent of the respondents tended to use hyperbolic discounting as a utility model from the full sample of 98. As a statistic this is insignificant. From the 64 identified hyperbolic discount respondents (as per Table 6) only two percent used hyperbolic discounting as a discounting utility model (Figure 8).

**Figure 8: Response rate for defined Hyperbolic Discounting Respondents**



*5.5.2.3 Scenario three: Buying Growing Company under good circumstance*

This scenario asked the respondent to buy a company whose share price is increasing steadily:

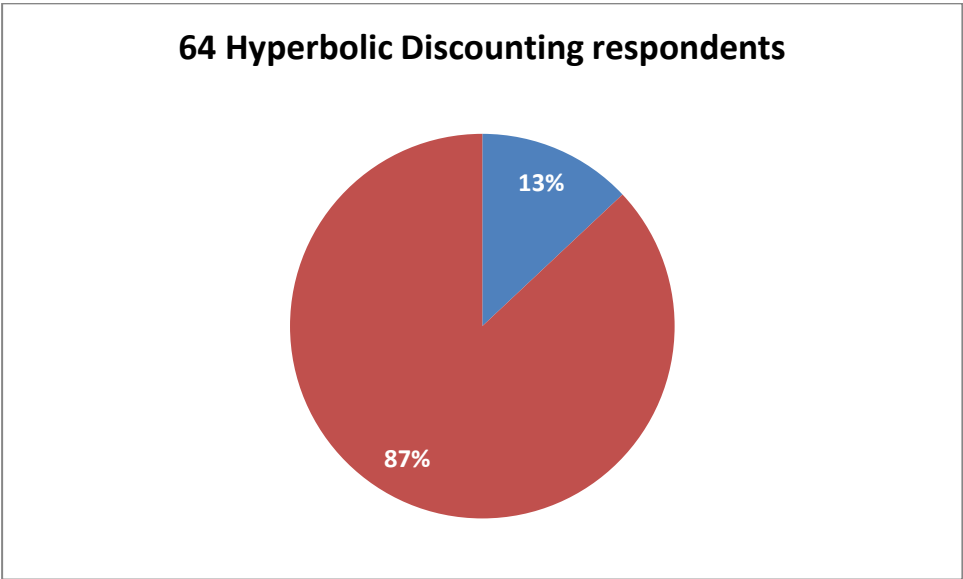
Q1: R800,000 today or R900,000 in a month

Q2: R1,200,000 in 12 months or R1,300,000 in 13 months

Q3: R800,000 today or R900,000 in a month or R1,200,000 in 12 months or R1,300,000 in 13 months.

Only eight percent of the respondents tended to use hyperbolic discounting as a utility model from the full sample. As a statistic this is insignificant. From the 64 identified hyperbolic discount respondents (as per Table 6) only 13% used hyperbolic discounting as a utility model (Figure 9).

**Figure: 9 Response rate for defined Hyperbolic Discounting Respondents**



*5.5.2.4 Scenario four: Buying Failing Company under good circumstance*

This scenario asked the respondent to buy a company whose share price is decreasing steadily but the purchase could give you a competitive advantage:

Q1: R900,000 today or R800,000 in a month

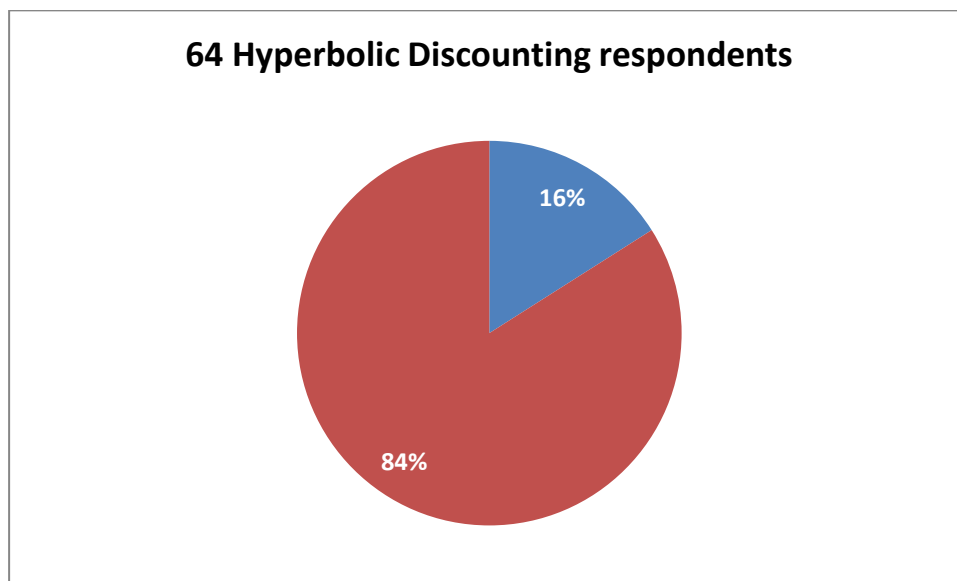
Q2: R600,000 in 12 months or R500,000 in 13 months

Q3: R900,000 today or R800,000 in a month or R600,000 in 12 months or R500,000 in 13 months.

Only 14% of the respondents tended to use hyperbolic discounting as a utility model from the full sample. As a statistic this is insignificant. From the 64 identified hyperbolic discount respondents (as per Table 6) only 16% used hyperbolic discounting as a utility model (Figure 10).



**Figure 10: Response rate for defined Hyperbolic Discounting Respondents**



### **5.5.3 Qualitative Responses:**

Respondents were asked to discuss reasons for their decisions at the end of every set of three questions in the four scenarios. As mentioned the 1<sup>st</sup> and 2<sup>nd</sup> question arranged the formulation for a possible discounting utility in question three. The following are comments made by the 64% hyperbolic discount respondents in response to their decisions, per scenario:

#### *5.5.3.1 Scenario 1 Bonus related:*

The following are qualitative feedback highlights:

- “Worth the wait for the money”
- “12-13 months too long a wait for double the reward”
- “200% more money is better than any investment”
- “R50,000 invested now will not give me R120,000 in 13 months’ time”
- “Don’t need the money now as it’s a bonus, so will wait”
- “It’s a guaranteed income so wait”

#### *5.5.3.2 Scenario 2 Selling stock under pressure:*

The following are qualitative feedback highlights

- “Sell at 10% as it’s a better rate and time frame”
- “Sell as much as you can in this month to off-set costs”
- “Sell it soonest”
- “Sell it at 10% as it is a high value product”
- “Sales are crucial so sell it in this month”

#### 5.5.3.3 Scenario 3 Acquiring growing company:

The following are qualitative feedback highlights

- “3 Months is a better time frame to structure deal”
- “Buy now and use advantage of purchase”
- “Share price determines value so buy now”
- “Reduce debt exposure by buying now”

#### 5.5.3.4 Scenario 4 Acquiring ailing company:

The following are qualitative feedback highlights

- “3 Months is a better deal. Structure debt and save R200,000”
- “Declining share price means problems, so take time”
- “Competitive advantage is important”
- “In 15 months business would have lost 50% value. No competitive edge will improve that decline”

The qualitative responses are the ones most frequently used and give valuable insight into the thought process as limited information existed to make a decision.

## 5.6 Phase 3: Hyperbolic Discounting, Organisational Level and MBTI Personality Type

What follows is the further analysis of the relationships between Hyperbolic Discounting, Organisational Level as defined to be executives and senior

managers and the MBTI personality styles with emphasis on Intuition and Judging personality style.

### 5.6.1 Hyperbolic Discounting and Organisational Level

A Chi-squared test for independence was selected.

The chosen level of significance is where Alpha = 0.05 which implies the null hypothesis will be rejected if alpha < 0.05.

**Table 13: Cross tabulation of Organisation Level and Hyperbolic Discounting (from 2 days & 9 days to 301 days & 308 days' time distance)**

		2,9 days to 301,308 days		Total
		Hyperbolic Discounting	No Hyperbolic Discounting	
Organisation Level	Executive	22	12	34
	Manager	41	23	64
Total		63	35	98

**Table 14: Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.011	1	.916		
Continuity Correction <sup>b</sup>	.000	1	1.000		
Likelihood Ratio	.011	1	.916		
Fisher's Exact Test				1.000	.548
Linear-by-Linear Association	.011	1	.916		
N of Valid Cases	98				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.24.

b. Computed only for a 2x2 table

The number of participants that were prone to apply hyperbolic discounting did not differ based on the organizational level,  $\chi^2(1, N = 98) = 0.011, p = .92$

**Table 15 Risk Estimate**

	Value	95% Confidence Interval	
		Lower	Upper

Odds Ratio for Organisation Level (Executive / Senior Manager)	1.048	.442	2.485
2days & 9 days to 301 days & 308 days = Hyperbolic Discounting	1.017	.747	1.384
2days & 9 days to 301 days & 308 days = Non Hyperbolic Discounting	.971	.557	1.692
N of Valid Cases	98		

One cannot claim that there is significant difference in the use of hyperbolic discounting for executives and senior managers.

The practical significance of this outcome can be observed by the ODDS Ratio which depicts a value of 1.048 implying that Executives are only 0.048 times more likely to use hyperbolic discounting than senior managers.

### 5.6.2 Hyperbolic discounting and MBTI Intuition

The research also sought to determine whether personality style has a relationship with the use of hyperbolic discounting, specifically whether there exists a relationship between MBTI Intuition and hyperbolic discounting. The Chi-square test for independence was repeated.

**Table 16: Cross-tabulation of Sensing/Intuition and Hyperbolic Discount (from 2 days & 9 days to 301 days & 308 days' time distance)**

		2 days & 9days to 301days & 308days		Total
		Hyperbolic Discounting	Non Hyperbolic Discounting	
	Intuition	36	17	53
	Sensing	27	18	45
Total		63	35	98

**Table 17: Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.779	1	.377		
Continuity Correction <sup>b</sup>	.451	1	.502		
Likelihood Ratio	.778	1	.378		
Fisher's Exact Test				.405	.251
Linear-by-Linear Association	.771	1	.380		
N of Valid Cases	98				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.91.

b. Computed only for a 2x2 table

The number of participants that were prone to apply hyperbolic discounting did not differ based on the MBTI Intuition personality style,  $\chi^2(1, N = 98) = 0.78, p = .34$

**Table 18: Risk Estimate**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Intuition / Sensing	1.451	.634	3.321
2days & 9 days to 301 days & 308 days = Hyperbolic Discounting	1.142	.847	1.540
2days & 9 days to 301 days & 308 days = Non Hyperbolic Discounting	.787	.462	1.340
N of Valid Cases	98		

This outcome suggests that there is no significant relationship between the MBTI Intuition personality and the use of hyperbolic discounting.

The practical significance of this outcome can be observed by the ODDS Ratio which depicts a value of 1.451; implying that people with MBTI Intuition personality style are only 0.451 times more likely to use hyperbolic discounting than those with MBTI Sensing personality style.

### 5.6.3 Hyperbolic discounting and MBTI Judging

The research sought to determine whether personality style has a relationship with the use of hyperbolic discounting, specifically whether there exists a relationship between MBTI Judging and hyperbolic discounting. The Chi-square test for independence can thus be repeated.

**Table 19: Cross-tabulation of Perceiving/Judging and Hyperbolic discounting (from 2 days & 9 days to 301 days & 308 days' time delay)**

		2 days & 9days to 301days & 308days		Total
		Hyperbolic Discounting	Non Hyperbolic Discounting	
	Judging	34	22	56
	Perceiving	29	13	42
Total		63	35	98

**Table 20: Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.872 <sup>a</sup>	1	.350		
Continuity Correction <sup>b</sup>	.521	1	.470		
Likelihood Ratio	.879	1	.349		
Fisher's Exact Test				.401	.236
Linear-by-Linear Association	.863	1	.353		
N of Valid Cases	98				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.20.

b. Computed only for a 2x2 table

The number of participants that were prone to apply hyperbolic discounting did not differ based on the MBTI Judging personality style,  $\chi^2(1, N = 98) = 0.87, p = .35$

**Table 21: Risk Estimate**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio Perceiving/Judging	.670	.288	1.556

2days & 9 days to 301 days & 308 days = Hyperbolic Discounting	.870	.652	1.161
2days & 9 days to 301 days & 308 days = Non Hyperbolic Discounting	1.299	.743	2.272
N of Valid Cases	98		

This outcome suggests that there is no relationship between the MBTI Judging personality style and it has no significant relationship and the use of hyperbolic discounting.

The practical significance of this outcome can be observed by the ODDS Ratio which depicts a value of 0.670 implying that MBTI Judging personality style are only 0.330 times less likely to use hyperbolic discounting than MBTI Perceiving personality style.

#### 5.6.4 MBTI Intuition and Organisational Level

The research also sought to determine whether personality style has a relationship with organisational level, specifically whether there exists a relationship between MBTI Intuition for executives and senior managers. The Chi-square test for independence was repeated.

**Table 22: Cross-tabulation of Organisation Level and MBTI Sensing/Intuition**

		Sensing/Intuition		Total
		Intuition	Sensing	
	Executives	18	16	34
	Senior Manager	35	29	64
Total		53	45	98

**Table 23: Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.054	1	.817		
Continuity Correction <sup>b</sup>	.000	1	.985		
Likelihood Ratio	.054	1	.817		
Fisher's Exact Test				.835	.491
Linear-by-Linear Association	.053	1	.818		

N of Valid Cases	98				
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a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.45.

b. Computed only for a 2x2 table

The number of participants that were executives and senior managers did not differ, based on the MBTI Intuition personality style,  $\chi^2(1, N = 98) = 0.54, p = .82$ . Essentially, the intuitive style did not characterise executives more than senior managers, or vice versa.

**Table 24: Risk Estimate**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Executives / Senior Managers	.906	.394	2.083
Sensing/iNtuition = Intuitors	.956	.651	1.404
Sensing/iNtuition = Sensors	1.055	.674	1.650
N of Valid Cases	98		

The practical significance of this outcome can be observed by the ODDS Ratio which depicts a value of 0.906, implying that executives are 0.094 times less likely to use the MBTI Intuition personality style than senior managers.

### 5.6.5 MBTI Judging and Organisational Level

The research then determined if personality style has a relationship with organisational level, specifically whether there exists a relationship between MBTI Judging for executives and senior managers. The Chi-square test for independence was repeated.

**Table 25: Cross-tabulation of Organisation Level and Perceiving/Judging**

		Perceiving/Judging		Total
		Judgers	Perceivers	
	Executives	18	16	34
	Senior Manager	38	26	64
Total		56	42	98



**Table 26 Chi-Square Tests**

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.277	1	.599		
Continuity Correction <sup>b</sup>	.098	1	.755		
Likelihood Ratio	.276	1	.599		
Fisher's Exact Test				.671	.376
Linear-by-Linear Association	.274	1	.601		
N of Valid Cases	98				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.77.

b. Computed only for a 2x2 table

The number of participants that were executives and senior managers did not differ based on the MBTI Judging personality style,  $\chi^2(1, N = 98) = 0.28, p = .60$

**Table 27: Risk Estimate**

	Value	95% Confidence Interval	
		Lower	Upper
Odds Ratio for Executives / Senior Managers	.799	.347	1.842
Perceiving/Judging = Judgers	.906	.621	1.321
Perceiving/Judging = Perceivers	1.133	.716	1.792
N of Valid Cases	98		

The intuitive style did not characterise executives more than senior managers, or *vice versa*.

The practical significance of this outcome can be observed by the ODDS Ratio which depicts a value of 0.799 implying that executives are 0.201 times less likely to use the MBTI Judging personality style than senior managers.

# CHAPTER 6: DISCUSSION OF RESULTS

## 6.1 Introduction

Numerous authors such as Berns et al. (2007) and Zauberman et al. (2009) have reported the effect of intertemporal choices. Discount utility models known as exponential discounting, quasi-hyperbolic discounting and hyperbolic discounting were born from intertemporal choices to explain why people discount rewards over time based periods.

The purpose of the study was to find the existence of hyperbolic discounting in the senior organisational levels within the FMCG industry. Further the study sought to ascertain whether a relationship between MBTI personality styles (focussing on Intuition and Judging), organisational level and the tendency to apply hyperbolic discounting as a discount utility model, exists.

“Hyperbolic discounting refers to a declining time discounting rate, e.g., when the discount factor is given by  $1/(1+rt)$ . Quasi hyperbolic discounting model may be viewed in terms of the following set of discount factors  $\{1, \beta\delta, \dots, \beta\delta t, \dots\}$  where the discount factor of  $\beta\delta$  across the first two periods is smaller than the discount factor of  $\delta$  for adjacent periods for subsequent periods” (Chark et al., 2012, p2). To the researcher, hyperbolic discounting is seen as a discount utility model applied over a time period and expressed in either discount percentage or a monetary value.

Strategic decisions are those decisions that determine the future outcome of the company within a targeted industry or environment (Kelly, & Gennard, 2007). MBTI personality styles affect the strategic decisions as many of these are made taking into account the individual’s preference to apply Rational, Feeling, Intuition, Sense, Judgment or Perception (Leykin & DeRubeis, 2010). Certainty, time and risk also play a role in strategic decision making and personality styles have a strong relationship with those decisions (Culp & Smith 2009). Hyperbolic discounting as a utility model deals with how individuals discount future outcomes, taking into consideration the time span waiting for the reward or benefit, the actual size of the reward or benefit and the need for immediate

gratification as seen through the lens of uncertainty and impatience (Rahman, & De Feis, 2009).

What follows is the explanation of the interaction, if any, of the outcomes of the above mentioned constructs as evident in Chapter 5 of this study. The following outcomes are addressed in similar phases (one, two and three) as well as the qualitative feedback as seen in the open-ended questions and the hypotheses as stated in Chapter 3, are then answered.

### **6.1.1 Phase 1: Hyperbolic Discounting**

Existing literature (Frederick et al., 2002; Dasgupta & Maskin, 2005; Berns et al., 2007; Zauberman et al., 2009 etc.) has found that hyperbolic discounting has an impact on the decisions made by individuals when faced with time based rewards and that immediate gratification exists.

The results from the Phase 1 test was based on a similar test done by Chark et al (2012) (Singapore) and adapted to fit the local currency. The time frames (proximate, delayed and remote menus) were kept the same. The tests were based on the following:

- $\text{Discount}_{2\text{days and } 9\text{days}} < \text{Discount}_{301\text{days and } 308\text{days}}$  (a significant difference was expected)

There is sufficient evidence with a p value = 0.000, to suggest that the observed discount factor for proximate menu (two days and nine days) is significantly different from remote menu (301 days and 308 days). This implies that hyperbolic discounting has occurred.

*To this end Hypothesis 1 (H1: Executives and senior managers are not likely to hyperbolic discount) is rejected.*

Furthermore, the results demonstrate that there is an equal division of hyperbolic discounters between executives (65%) and senior managers (64%). There also exists a degree of similarity between personality styles Sensing/Perceiving (69%), Intuition/Perceiving (69%) and Intuition/Judging

(67%) with only Sensing/Judging that have a lesser tendency to hyperbolic discount, recorded at 55%.

The latter has a degree of expectancy as the two personality types, Sensing and Judging, are known to be more detailed in accumulating information as well as preferring a very structured way in dealing with circumstances or choices (Culp & Smith, 2009).

### **6.1.2 Phase 2: Scenario based Hyperbolic Discounting**

Four scenarios were created to ascertain if differences in circumstances would play a role in strategic decision making and the tendency to hyperbolic discount. Future uncertainty and a level of increased transaction costs occur when comparing future rewards and immediate rewards (Harrison, Lau, Williams, 2002). This has an impact on strategic decision making and the view of the current benefit and long term benefit. The decisions were based over specific time periods and decisions made under time pressures could result in the decision maker being either biased, not taking all influences into consideration or have a tendency to procrastinate (Kocher, & Sutter, 2006). Furthermore the individuals' personality styles (Intuition and Judging) should have an impact as the manner in which he/she interprets the current and future outcomes can differ (Culp & Smith, 2009).

What follows are the findings relating to the four different scenarios in combination with the qualitative responses received:

#### *6.1.2.1 Scenario One: Rewards based*

The manner of measure (or model) of hyperbolic discounting was to analyse the three questions in isolation of one another. The respondent had to choose two monetary values in question one (R50,000 today or R60,000 in a month's time) and two (R100,000 in 12 months' time or R120,000 in 13 months' time) and a combination of all both questions in question three. The hyperbolic discount function would apply if the respondent chose R60,000 in question one, R120,000 in question two and then R60,000 in question three. The respondent

would then effectively discount the R120,000 over the time period he/she had to wait to receive the money.

This scenario had the highest percentile of all the scenarios at 17% of the total group applying hyperbolic discounting. Of the 64% hyperbolic discounters identified in the replicated test only 20% applied hyperbolic discounting in this scenario. The majority of the respondents tended to choose the R120,000 bonus in 13 months', from day one.

The qualitative responses varied from "Worth the wait for the money", "200% more money is better than any investment", "R50,000 invested now will not give me R120,000 in 13 months' time" to "It's a guaranteed income so wait" which implies that there was a certainty about the outcome. The volatility of the current market place and uncertainty also played a part in not investing it in stocks or bonds as the return is not guaranteed. The only real outcome for the hyperbolic discounters' qualitative responses was "12-13 months to long a wait for double the reward" which implies the time discount was too long.

The null hypotheses that: *H<sub>1</sub> Executives and senior managers are not likely to apply hyperbolic discounting* will not be rejected.

What needs to be taken into consideration is that money can be stored and that respondents do not necessarily view it as the same with other immediate consumables. This then creates an interdependence with discounting utility (Benhabib, Bisin, & Schotter, 2010).

The measure or model to test hyperbolic discounting worked similarly for the balance of the scenarios.

#### *6.1.2.2 Scenario Two: Selling under pressure*

The scenario presented choices over a time period, which were based on percentages to discount stock that the company needs to sell, owing to an overstock situation. The product is a high value product and the respondents had to make assumptions on what stock amounts would move at various discounted percentages.

Only five percent of the total group applied hyperbolic discounting in this particular scenario. Of the 64% identified hyperbolic discounters, a mere two percent used hyperbolic discounting as a discount utility model. There exists a high level of uncertainty in this scenario as the questionnaire is very limited in the outcome of what the percentage discounting will represent in the amount of stock moved at a specific discount. Respondents tend to prefer certainty and will behave in large as discounting utility users in times of uncertainty (Andreoni, & Sprenger, 2012).

In Yoram Halevy's theorem of diminishing impatience (Halevy, 2008) as quoted by Kota Saito (2011) there exists a relationship between strong diminishing impatience (i.e. hyperbolic discounting) and certainty. The more risk-free the prospect is the less impatience there is and the possibility for application of hyperbolic discounting.

It could be perceived as a risk area as no guarantees were given on the amount of stocks sold at discounted percentages and thus the respondents possibly decided that the sooner the stocks are moved the less risk of additional costs in the future. The qualitative responses also mentioned these sentiments: "Sell at 10% as it's a better rate and time frame", "Sell as much as you can in this month to off-set costs" and "Sales are crucial so sell it in this month".

#### *6.1.2.3 Scenario Three: Acquiring growing company*

The respondents had to decide on a monetary value (not utility in form of a benefit in reward) and time based acquisition of a company that is performing well if measured by share price escalation. The only warning to heed was that the deal was financed by debt but the percentage or debt/equity ratios were not given. A measure of assumption that the company could afford it had to be made.

Of the 64% of hyperbolic discounters only 13% applied hyperbolic discounting in this scenario. Respondents tend to overvalue risk-free prospects in desecration of utility (Cerreia-Vioglio, Dillenberger, & Ortoleva, 2013) and this could be the reason for the lack of a discount utility in this scenario. Other than the financing of debt, the acquisition is an easy choice and most respondents

commented: “Buy now and use advantage of purchase”, “Share price determines value so buy now” and “Reduce debt exposure by buying now”.

The need to buy now and use the company is seen as an impatient scenario whereby the tendency to hyperbolic discount will diminish.

#### *6.1.2.4 Scenario Four: Acquiring ailing company*

Of the 64% hyperbolic discounters identified only 16% tended to apply it as their discount utility model in this scenario. A level of risk is involved here as one respondent commented “In 15 month’s business would have lost 50% value. No competitive edge will improve that decline”. The competitive edge/advantage was not enough to compensate for the decline in value of share price.

Many respondents however did feel the competitive advantage was useful but were seen as being more tolerant in structuring the deal, as seen by comments: “3 Months is a better deal. Structure debt and save R200,000”, “Declining share price means problems, so take time” and “Competitive advantage is important”.

The difference between scenario three and four is that of higher risk and a monetary decline in paying for the acquisition. The monetary value was chosen over the utility (competitive advantage) alone and this is seen as the magnitude effect (Noor, 2008). The magnitude effect is more comparable with exponential discounting as Noor (2008) described. This is perceived to be the reason for the low amount of hyperbolic discounting. The monetary value spent on the ailing company seemed to be the deciding factor.

#### *6.1.2.5 Conclusion:*

The different scenarios did affect the tendency to hyperbolic discount and one can thus see that circumstances, time pressures, uncertainty, complexity and number of interdependencies have an influence on strategic decision making (Kocher, & Sutter, 2006; Rahman, & De Feis, 2009). Where a preference for certainty exists, it is found that subjects prefer the current certainty than the future uncertainty (Andreoni, & Sprenger, 2012). The above scenarios also support the Allais Paradox (in Halevy, 2008) that suggested in times of

uncertainty the subjects will maximise utility but if there is any certainty in an option the subject will undoubtedly choose the certain route.

### **6.1.3 Phase 3: Hyperbolic Discounting, Organisational Level and MBTI**

In this phase the findings were completed as per the hypotheses, as stated in Chapter 3. The first hypothesis has been answered.

#### *6.1.3.1 Executives, Senior Managers and hyperbolic discounting as a discounting utility model.*

Elliott Jacques (1986) stated that the higher up the leader is in an organisation, the more complex the decision making (strategic) and environment becomes. Strategic decisions are complex in nature. It is known that the board of directors are the ones making the strategic decisions and those strategies have the long term vision in mind (Kelly, & Gennard, 2007). Senior Managers are the ones who tend to assist in strategic decisions, but at a lower level down the hierarchy and they are also involved in the operational (day-to-day, month-to-month) execution of the strategy (Rahman, & De Feis, 2009).

Hyperbolic discounting foregoes long term larger rewards for small current rewards (Berns et al., 2007) and many of these decisions are based on the environment, risk, uncertainty and the interdependence of department strategies (Rahman, & De Feis, 2009; Andreoni, & Sprenger, 2012). Seeing that senior managers are more focussed on the now and that executives are more focussed on the longer term, one would assume that senior managers would have a higher tendency to apply hyperbolic discounting to ensure they meet the targets of today, this month or this fiscal. The test and research however display the following results:

*The number of participants that were prone to apply hyperbolic discounting did not differ based on the organizational level,  $\chi^2(1, N = 98) = 0.011, p = .92$*



There does not exist a relationship between hyperbolic discounting and either executives nor senior managers. It is found that they are equally likely or unlikely to apply it based on circumstances.

#### *6.1.3.2 MBTI (Intuition and Judging) personality style and hyperbolic discounting*

Culp and Smith (2009) have identified that Intuition as a personality style is determined in the way that individuals prefer to assimilate information. Intuition becomes stronger over time the more an individual has similar experiences, gains expertise in a field or finds similarities within certain circumstances (Leybourne, & Sadler-Smith, 2006). Intuition is the gut feel that drives the decision making process based on past experiences. The higher up the organisation the more intuition is used in making strategic decisions (Sadler-Smith, & Shefy, 2004).

Hyperbolic discounting as a utility model is used to gain immediate rewards in the face of uncertainty and this could influence those intuitive decisions. The test results for the research have found:

*The number of participants that were prone to apply hyperbolic discounting did not differ based on the MBTI Intuition personality style,  $\chi^2(1, N = 98) = 0.78, p = .34$*

The research results have demonstrated no significant relationship between intuition and hyperbolic discounting. Halevy (2008) and Noor (2008) stated that hyperbolic discounting (and quasi-hyperbolic discounting) is found within subjects who have diminishing impatience (strong and otherwise) and it could thus be assumed that intuition is used in situations where there is a larger degree of increasing impatience. This is further substantiated by time pressures and bounded-rationality as found by Rahman and De Feis (2009).

Culp and Smith (2009) have identified that Judging as a personality style is determined by how individuals prefer a structured environment to live in. Judging personality style is structured in the approach to collecting data, assimilating information, deducing answers and then making decisions based

on possible outcomes. The process is structured and nothing is left for larger picture thinking or spontaneity in decision making.

Hyperbolic discounting is a utility model used when individuals analyse a scenario (usually framed by utility, time and money discounting) and have to make judgment if the immediate reward is preferable to the longer term (usually more significant) reward. The individual/subject has to decide, based on analysis of the outcomes, what the best possible result will be within the current and possible future environment (Frederick et al., 2002).

The result of the research questionnaire has found:

*The number of participants that were prone to apply hyperbolic discounting did not differ based on the MBTI Judging personality style,  $\chi^2(1, N = 98) = 0.87, p = .35$*

There exists little or no relationship of any significance between Judging personality style and the tendency to apply hyperbolic discounting. It could be assumed that in an environment of certainty (risk-free) that the subject would choose the best result irrespective of a discounting utility model.

#### *6.1.3.3 MBTI (Intuition and Judging) personality style and decision making between executives and senior managers (organisational level)*

As previously found, complexity increases higher up the organization (Jaques, 1986) and thus becomes part of the strategy and decision making process for all executives and senior manager who are known to use their intuition more often in strategic decision making. It is also found by Sadler-Smith and Shefy (2004) that the higher up the organisational hierarchy, the stronger the sense or use of intuition becomes. This would apply for both the senior manager and the executive.

It is mostly found that the executives on the organisations' boards have been in the organisation (or similar organisation) for many years or come from similar environments and have years of experience in their respective fields (Leybourne, & Sadler-Smith, 2006). This will lead to higher levels of seniority

within the organisation. As it is found that intuition is used more frequently up the hierarchy and that there is a seniority difference between executives and senior managers one could believe that there would be a difference in the use of intuition in strategic decision making.

The research questionnaire feedback has resulted in the following finding:

*The number of participants that were executives and senior managers did not differ based on the MBTI Intuition personality style,  $\chi^2(1, N = 98) = 0.54, p = .82$ .*

Ahmed et al. (2012) found that the Judging personality style had a tendency to be more analytical, whereby the subject would analyse and identify possible defects and then make a decision based on those findings. Executives and senior managers need to be analytical by approach as they deal with data (research data, financial data, and sales data) on a daily basis. It is also a known fact that to progress within a hierarchical structure the subject needs to demonstrate analytical ability as it goes hand in hand in identifying obstacles. Analytical skills are strongly associated with problem solving ability (Butler, 2010)

With higher levels of complexity the level of obstacles increase and thus a higher level of analytical and problem solving skills are required (Jaques, 1986; Butler, 2010). It could thus be implied that executives have a higher level of complexity and need to have a higher level of analytical skills than senior managers. The research finding for this tested as follows:

*The number of participants that were executives and senior managers did not differ based on the MBTI Judging personality style,  $\chi^2(1, N = 98) = 0.28, p = .60$*

In other words, the Intuitive and Judging personality style did not characterise executives more than senior managers, or *vice versa*. There is no significant relationship in use of intuition and judgment within organisational levels defined as executives and senior managers.

#### *6.1.3.4 Conclusion*

The outcomes of the study confirm strong hyperbolic discounting tendency for executives and senior managers if tested against monetary value that is comparable over time. Hyperbolic discounting was not shown in any of the scenario based questions and this could have been due to possible effects of certainty, risk, impatience, limitations of information given and heterogeneity (Schuhr, 2009).

The results also express that no significant relationship between MBTI personality styles Intuition and Judging exists for executives and senior managers when making decisions. There is furthermore no significant preference of one personality style over the other when making decisions and there is no relationship between the personality styles and the tendency to apply hyperbolic discounting.

The outcome could be seen as “situational” hyperbolic discounting whereby certainty plays a significant part in the outcome. Where certainty exists, the respondent will rather pursue that specific outcome than venture an uncertain outcome in the future (Andreoni, & Sprenger, 2012).

# **CHAPTER 7: CONCLUSION**

## **7.1 Introduction**

The study sought to determine whether there exist relationships between strategic decision making, organisational level, personality style as defined by MBTI and the tendency to apply hyperbolic discounting. The organisational levels were defined as executives and senior managers whilst focus was only the MBTI Intuition and MBTI Judging personality styles.

The main findings were the existence of a tendency towards hyperbolic discount by 64% of the senior managers and executives. This was based on a comparison of a consistent monetary value (R100) comparable to escalating values (R101, R104, R107 up to R128) over three base periods of two days and nine days, 31 days and 38 days and lastly 301 days and 309 days. The respondents had to make decisions on best possible outcomes in the monetary value scenario as well as the four real life scenarios that were created. The results showed little or no significant relationship towards hyperbolic discounting. The reasons for this outcome could be seen as a lack of more critical information, high levels of uncertainty, high levels of risk as well as guarantees of outcome.

There was no occurrence of any significance of relationship/s between the MBTI Intuition personality style and hyperbolic discounting or between the latter and MBTI Judging personality style. Further, no preference in personality style of either Intuition or Judging was noticeable in organisational level when making strategic decisions.

## **7.2 Implication of the Research:**

In this section the researcher aims to discuss the limitations of the research, and the influence of outcome on business.

### 7.2.1 Research limitations

As the first phase of the research was a replication of tests done in Singapore the researcher found similar limitations and conclusions. Firstly hyperbolic discounting occurred between the furthest two dates, namely 2<sub>days</sub> and 9<sub>days</sub> to 301<sub>days</sub> and 308<sub>days</sub>. There is also a rejection of constant temporal discounting beyond the present period. The first phase of the research provides some indication of the amount of respondents (executives and senior managers) who tended to discount through the 3 dates, namely 2<sub>days</sub>,9<sub>days</sub>; 31<sub>days</sub>,38<sub>days</sub> and 301<sub>days</sub>,308<sub>days</sub>. The differences from 31<sub>days</sub>, 38<sub>days</sub> to 301<sub>days</sub>, 308<sub>days</sub> did not yield any significance (Chark et al., 2012).

The delay menu (31<sub>days</sub> and 38<sub>days</sub>) is seen to be part of Quasi hyperbolic discounting and was not part of this study. Quasi hyperbolic discounting relies on the subject to make better decisions into different future intervals, but due to uncertainty that it will be so; the current period is seen to be discounted at a larger rate (Laibson, D. (1997).

The researcher also recognised that certain transaction costs (financing of debt etc.) could have a bias towards the outcome as is commonly found in discounting utility experiments (Halevy, 2008; Benhabib et al., 2010). The uncertainty, time constraints and lack of information would have prompted the respondents to make certain assumptions based on the data provided in the scenario based questions. Uncertainty and time pressure is a significant factor in decision making (Andreoni, & Sprenger, 2012) and could possibly change the outcome if measured in a more stable environment. Framing effects or hypothetical rewards could be seen to skew the possible outcome.

The qualitative feedback was part of the written explanations prompted by the open-ended questions within the scenario based part of the study (phase 2). Again it is important to state that limited information was given and that the respondents had to make certain assumptions about each scenario. The feedback on the qualitative responses was used to generalize the answers, taking into consideration grouping of the responses into those who applied hyperbolic discounting and those who did not.

The study focused only on the MBTI Intuition and MBTI Judging as it gave two opposite preferences in formulating data. Francis, Craig, and Robbins (2007) explained that MBTI Judging is the way subjects deal with making decisions and that it has two functions in MBTI Thinking and Feeling. The MBTI Perceiving gives preference to the way subjects absorb information and the two functions associated are MBTI Intuition and Sensing. It is the researcher's perception that if MBTI Perceiving has Intuition and Sensing as factors and Judging has Thinking and Feeling as factors, that Judging and Intuition are then opposites in decision-making theory. This may be further explored in research.

### **7.2.2 Business impact of the study**

The impact on a business level is felt when the long term greater reward is substituted by the shorter term smaller reward. In a fast-changing environment it is important to understand the impact of time pressure on strategic decisions (Kocher, & Sutter, 2006). The FMCG environment is one laden with uncertainty, risk and time pressures on which strategic decisions are built. These decisions are paramount for long term sustainability.

The executives are responsible for the strategy of the company and are at the pinnacle of the organisations' hierarchical designs (Kelly, & Gennard, 2007). Literature hereto also shows that Intuition is a driving force behind the decisions made by executives and senior managers. The tendency to hyperbolic discount was proven to exist (64%) for the respondents of this study on a monetary basis depicted over a certain time period. It did not show that there was a significant tendency to hyperbolic discount in the scenario based questions and it could be seen as due to levels of uncertainty and risk.

Many companies have financial years which they operate within. These financial years demonstrate whether an organisation made a profit or loss which will be the outcome of the shorter term operational implementations that form part of the long-term vision or strategy.

It is recommended that organisations have a clear understanding of what strategic decisions are and who are making those decisions. It was found that

although intuition is a strong force in decision making higher up the hierarchical chain, there is little to no difference in use between senior managers and executives. This could possibly be due to similarity in experience and expertise between the two levels. This was also the finding in making important judgment calls. It is suggested to have a clear understanding of all the data and influences involved in scenario planning and to be analytical in approach to decision making. It is however also important not to procrastinate or have high levels of impatience when it comes to making the final decision.

The tendency to apply hyperbolic discounting was evident in the monetary value comparison test and it shows the tendency to want an immediate reward over a longer term, possibly greater, reward. This could be due to the fact that the FMCG industry is driven on strong sales needs and that the future uncertainty is seen a major risk factor. High levels of impatience could deter the better decision and outcome over a longer period. It is important that senior managers and executives highlight the longer term focus areas (marketing of brands) and the shorter term wins (selling of overstocks) which do not sway the organisation from its long term goal and strategy.

It is further suggested that employees be aware of the MBTI personality styles of their fellow employees to understand the manner in which they act, absorb data, prefer to make decisions as well as preferences to risk-aversion, uncertainty and time pressures. The understanding should lead to a healthier work environment and ultimately a healthier organisation.

### **7.3 Future Research:**

Most recent studies on Hyperbolic discounting has been done on monetary value reward based questionnaires or options that have shown significance in finding that subjects are prone to hyperbolic discount (Benhabib et al., 2010; Chark et al., 2012; Cerreia-Vioglio et al. 2013). More research is needed to explain why these same subjects are not prone to hyperbolic discount in scenario based circumstances. The generalizability of studies dealing specifically with non-scenario-based hyperbolic discounting should also be



questioned, as the research illuminates specific scenarios would frame decision-making. This implies that the current studies and the use of “framing” (whereby the frame work of the questionnaire pulls the respondent into a certain direction) could lead to the desired result.

Two indicators not covered in this research is that of MBTI Extrovert and Introvert personality styles and this could be a further study as research has found that there are relationships between hierarchy and MBTI Extrovert/Introvert personality styles (Moutafi et al., 2007). MBTI Judging personality style encapsulates Thinking and Feeling but an in-depth study of all 16 personality styles provide greater clarity on organisational levels’ and personality styles’ influence on decision making and the tendency to hyperbolic discount in scenario based circumstances.

Strategic decisions are more prevalent higher up the hierarchical chain and seeing only 34 respondents were from the Executive level in this study, it is worthwhile to complete a further study on a greater number of executives to understand the existence of Hyperbolic discounting as a utility model. With 34 executives responding to this study it is not possible to exclude bias.

## REFERENCE LIST

- Ahmed, A., Hasnain, N., & Venkatesan, M. (2012). Decision Making in Relation to Personality Types and Cognitive Styles of Business Students. *The IUP Journal of Management Research*, 11(2), 20-29.
- Andreoni, J., & Sprenger, C. (2012). Risk preferences are not time preferences. *The American Economic Review*, 102(7), 3357-3376.
- Behaz, A., & Djoudi, M. (2012). Adaptation of learning resources based on the MBTI theory of psychological types. *International Journal of Computer Science*, 9.
- Benhabib, J., Bisin, A., & Schotter, A. (2010). Present-bias, quasi-hyperbolic discounting, and fixed costs. *Games and Economic Behavior*, 69(2), 205-223.
- Berns, G. S., Laibson, D. I., & Loewenstein, G. (2007). Intertemporal choice-toward an integrative framework.
- Bower, K. M. (2003, August). When to use Fisher's exact test. In *American Society for Quality, Six Sigma Forum Magazine* (Vol. 2, No. 4, pp. 35-37).
- Butler, S. A. (2010). Solving business problems using a lateral thinking approach. *Management Decision*, 48(1), 58-64.
- Brown, F. W., & Reilly, M. D. (2009). The Myers-Briggs type indicator and transformational leadership. *Journal of Management Development*, 28(10), 916-932.
- Bryman, A. (1988). Chapter 5: The debate about quantitative and qualitative research. Quantity and quality in social research.
- Buyl, T., Boone, C., Hendriks, W., & Matthyssens, P. (2011). Top management team, functional diversity and firm performance: the moderating role of CEO characteristics. *Journal of management studies*, 48(1), 151-177.
- Cerreia-Vioglio, S., Dillenberger, D., & Ortoleva, P. (2013). *Cautious Expected Utility and the Certainty Effect*. Mimeo California Institute of Technology.

- Chabris, C. F., Laibson, D. I., & Schuldt, J. P. (2006). Intertemporal choice. *The new Palgrave dictionary of economics*, 2.
- Chark, R., Chew, S., & Zhong, S. (2012). Extended Present Bias: A Direct Experimental Test of the Hyperbolic Discounting Hypothesis. *Available at SSRN 1743227*.
- Cooper, A. C, Knotts, H. G., McCord, D. M., & Johnston, A. (2012). Taking Personality Seriously: The Five-Factor Model and Public Management. *The American Review of Public Administration*, 1-19, DOI: 10.1177/0275074012446509
- Culp, G., & Smith, A. (2009). Consulting engineers: Myers-Briggs type and temperament preferences. *Leadership and Management in Engineering*, 9(2), 65-70.
- Dane, E., & Pratt, M. G. (2007). Exploring Intuition and Its Role in Managerial Decision Making. *Academy of Management Review*, 32(1), 33-54.
- Dasgupta, P., & Maskin, E. (2005). Uncertainty and hyperbolic discounting. *The American Economic Review*, 95(4): 1290-1299.
- Delice, A. (2010). The Sampling Issues in Quantitative Research. *Educational Sciences: Theory and Practice*, 10(4), 2001-2018
- Diamond, P., & Köszegi, B. (2003). Quasi-hyperbolic discounting and retirement. *Journal of Public Economics*, 87(9), 1839-1872.
- Dionne, S. D., & Dionne, P. J. (2008). Levels-based leadership and hierarchical group decision optimization: A simulation. *The Leadership Quarterly*, 19(2), 212-234.
- Eisenhardt, K. M., & Zbaracki, M. J. (1992). Strategic decision making. *Strategic Management Journal*, 13(S2), 17-37.
- Filbeck, G., Hatfield, P., & Horvath, P. (2005). Risk aversion and personality type. *The Journal of Behavioral Finance*, 6(4), 170-180.
- Francis, L. J., Craig, C. L., & Robbins, M. (2007). The relationship between psychological type and the three major dimensions of personality.

*Current Psychology: Developmental• Learning• Personality• Social*, 25(4), 257-271.

Frederick, S., Loewenstein, G., & O'donoghue, T. (2002). Time discounting and time preference: A critical review. *Journal of economic literature*, 40(2), 351-401.

Fornaciari, C. J., & Dean, K. L. (2012). I, S, T, and J Grading Techniques for Es, Ns, Fs, and Ps: Insights From the MBTI on Managing the Grading Process. *Journal of Management Education*.

Gehring, D. R. (2007). Applying traits theory of leadership to project management. *Engineering Management Review, IEEE*, 35(3), 109-109.

Gillham, B. (2000). *Developing a Questionnaire*. London. Continuum.

Gray, D. (2004). *Doing research in the real world*. London: Sage.

Goldin, J. (2007). Making decisions about the future: the discounted-utility model. *Mind Matters: The Wesleyan Journal of Psychology*, 2, 49-56.

Halevy, Y. (2008). Strotz meets Allais: Diminishing impatience and the certainty effect. *The American Economic Review*, 98(3), 1145-1162.

Harrison, G. W., Lau, M. I., & Williams, M. B. (2002). Estimating individual discount rates in Denmark: A field experiment. *The American Economic Review*, 92(5), 1606-1617.

Heller, F. A. (1972). Research on Five Styles of Managerial Decision-Making. *International Studies of Management & Organization*, 2(1), 85-104.

Hough, J. R., & Ogilvie, D. T. (2005). An Empirical Test of Cognitive Style and Strategic Decision Outcomes\*. *Journal of Management Studies*, 42(2), 417-448.

Jaques, E. (1986). The development of intellectual capability: a discussion of stratified systems theory. *The Journal of applied behavioral science*, 22(4), 361-383.

Jankowicz, A. D. (2000). *Business Research Projects*, Thomson Learning, UK. ISBN 1-86152-549-4.

- Jung, C. G. (1971). Psychological types.(HG Baynes, Trans. revised by RFC Hull) Volume 6 of The collected works of CG. *Jung. Princeton, NJ: Princeton University Press (Original work published 1921).*
- Karelaia, N., & Hogarth, R. M. (2008). Determinants of linear judgment: a meta-analysis of lens model studies. *Psychological bulletin, 134*(3), 404.
- Kelly, J., & Gennard, J. (2007). Business strategic decision making: the role and influence of directors. *Human Resource Management Journal, 17*(2), 99-117.
- Kickul, J., Gundry, L. K., Barbosa, S. D., & Whitcanack, L. (2009). Intuition Versus Analysis? Testing Differential Models of Cognitive Style on Entrepreneurial Self-Efficacy and the New Venture Creation Process. *Entrepreneurship Theory and Practice, 33*(2), 439-453.
- Kocher, M. G., & Sutter, M. (2006). Time is money—Time pressure, incentives, and the quality of decision-making. *Journal of Economic Behavior & Organization, 61*(3), 375-392.
- Leybourne, S., & Sadler-Smith, E. (2006). The role of intuition and improvisation in project management. *International Journal of Project Management, 24*(6), 483-492.
- Leykin, Y., & DeRubeis, R. J. (2010). Decision-making styles and depressive symptomatology: Development of the Decision Styles Questionnaire. *Judgment and Decision Making, 5*(7), 506-515.
- Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics, 112*(2), 443-478.
- Lietz, P. (2010). Research into questionnaire design. *International Journal of Market Research, 52*(2), 249-272.
- Lim, W. M. (2011). Challenges in Strategic Decision Making and the Corresponding Solution Approaches. *Advances In Management.*
- Margerison, C., & Glube, R. (1979). LEADERSHIP DECISION-MAKING: AN EMPIRICAL TEST OF THE VROOM AND YETTON MODEL. *Journal of Management Studies, 16*(1), 45-55.

- Mintzberg, H., Raisinghani, D., & Theoret, A. (1976). The structure of "unstructured" decision processes. *Administrative science quarterly*, 246-275.
- Mischen, P. A., & Jackson, S. K. (2008). Connecting the dots: applying complexity theory, knowledge management and social network analysis to policy implementation. *Public Administration Quarterly*, 314-338.
- Moutafi, J., Furnham, A., & Crump, J. (2007). Is managerial level related to personality? *British Journal of Management*, 18(3): 272-280.
- Newhouse, J. P. (2006). Reconsidering the moral hazard-risk avoidance trade-off. *Journal of Health Economics*, 25(5), 1005-1014.
- Noor, J. (2009). Decreasing impatience and the magnitude effect jointly contradict exponential discounting. *Journal of Economic Theory*, 144(2), 869-875.
- O'Donoghue, T. E. D., & Rabin, M. (1999). in Preparing for Retirement. *Behavioral dimensions of retirement economics*, 125.
- O'Donoghue, T., & Rabin, M. (2000). The economics of immediate gratification. *Journal of Behavioral Decision Making*, 13(2), 233-250.
- Olson, P. D. (1985) Entrepreneurship: Process and abilities. *American Journal of Small Business*, 10(1), 25-31.
- Rahman, N., & De Feis, G. L. (2009). Strategic decision-making: Models and methods in the face of complexity and time pressure. *Journal of General Management*, 35(2), 43.
- Rasmusen, E. (2008). *Some common confusions about hyperbolic discounting* (No. 2008-11).
- Richards, T. J., & Pofahl, G. M. (2009). Commodity Prices and Food Inflation. *American Journal of Agricultural Economics*, 91(5), 1450-1455.
- Robert Mitchell, J., Shepherd, D. A., & Sharfman, M. P. (2011). Erratic strategic decisions: when and why managers are inconsistent in strategic decision making. *Strategic Management Journal*, 32(7), 683-704.

- Saaty, T. L., & Vargas, L. G. (2012). How to Make a Decision. In *Models, Methods, Concepts & Applications of the Analytic Hierarchy Process* (pp. 1-21). Springer US.
- Sadler-Smith, E., & Shefy, E. (2004). The intuitive executive: Understanding and applying 'gut feel' in decision-making. *The Academy of Management Executive*, 18(4), 76-91.
- Sadler-Smith, E., & Shefy, E. (2007). Developing Intuitive Awareness in Management Education. *Academy of Management Learning & Education*, 6(2), 186-205.
- Saito, K. (2011). Strotz Meets Allais: Diminishing Impatience and the Certainty Effect: Comment. *The American Economic Review*, 101(5), 2271-2275.
- Saunders, M. N., & Lewis, P. (2012). *Doing Research in Business and Management: An Essential Guide to Planning Your Project*. New York: Financial Times Prentice Hall.
- Schuhr, A. (2009) Structural Modelling of Heterogeneity in Time Preference and Management of Impulsive Choice.
- Sinclair, M., & Ashkanasy, N. M. (2005). Intuition Myth or a Decision-making Tool? *Management Learning*, 36(3), 353-370.
- Steel, P. (2007). The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological bulletin*, 133(1), 65.
- Xia, B. (2011). A simple explanation of some key time preference anomalies. *Canadian Journal of Economics/Revue canadienne d'économique*, 44(2), 695-708.
- Zauberman, G., Kim, B. K., Malkoc, S. A., & Bettman, J. R. (2009). Discounting time and time discounting: Subjective time perception and intertemporal preferences. *Journal of Marketing Research*, 46(4), 543-556.
- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2009). *Business research methods* (8<sup>th</sup> ed.). Belmont: Cengage Learning.

Zikmund. (2003). Business Research Methods. United States of America: South Western Cengage Learning.



# APPENDICES

## Appendix A:

I, Mark Daws, am doing research on strategic decision making and personality styles (as defined by MBTI) and the tendency to hyperbolic discount. The levels chosen for the study within the organization are that of executive and senior management, as these levels are mostly confronted with strategy and choices over different time periods. To that end, I am asked to question individuals on what seems more appropriate a decision based on scenarios.

This will allow me to understand the link (if any) between the above mentioned constructs. The questionnaire should not take more than 10 minutes of your time. Your participation is voluntary and you can withdraw at any time without penalty.

All data will be kept confidential. It is necessary to know the Meyers-Briggs-Type-Indicator score as to link the type of personality to the type of outcome of the questions asked. Again, this information will be kept confidential.

By completing the survey, you indicate that you voluntarily participate in this research. Should you have any concerns please contact me or my supervisor.

Mark Daws  
[mark.daws@yahoo.com](mailto:mark.daws@yahoo.com)  
0832658275

Dr. Charlene Lew  
[lewc@gibs.co.za](mailto:lewc@gibs.co.za)  
011 771 4000

Signature of Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Signature of Researcher: \_\_\_\_\_

Date: \_\_\_\_\_

**1. Personal-information:**

Please supply organisational level and Myers-Briggs Type Indicator for matching purposes.  
(Introvert[I]/Extrovert[E], Intuitive[N]/Sensing[S], Thinking[T]/Feeling[F],  
Judging[J]/Perceiving[P])

Name is optional.

Name: (optional)

Organisational Level:   
(Senior Management/Executive)

Myers-Briggs Type Indicator:   
(Example ENTJ)

**2. The list below states choices that must be made between two sums of money on a specific day. The task is to choose the preferred option between each of the 10 choices below. The first ten show an amount of money for a 2 day wait and the second column a 9 day wait for a larger amount.**

The choices need to be made as if you will receive the money on the given day as per your choice.

<b>2 days later</b>	<b>9 days later</b>
<input type="checkbox"/> R100	<input type="checkbox"/> R101
<input type="checkbox"/> R100	<input type="checkbox"/> R104
<input type="checkbox"/> R100	<input type="checkbox"/> R107
<input type="checkbox"/> R100	<input type="checkbox"/> R110
<input type="checkbox"/> R100	<input type="checkbox"/> R113
<input type="checkbox"/> R100	<input type="checkbox"/> R116
<input type="checkbox"/> R100	<input type="checkbox"/> R119
<input type="checkbox"/> R100	<input type="checkbox"/> R122
<input type="checkbox"/> R100	<input type="checkbox"/> R125
<input type="checkbox"/> R100	<input type="checkbox"/> R128

**3. The list below states choices that must be made between two sums of money on a specific day. The task is to choose the preferred option between each of the 10 choices below. The first ten show an amount of money for a 31 day wait and the second column a 38 day wait for a larger amount.**

The choices need to be made as if you will receive the money on the given day as per your choice.

31 days later	38 days later
<input type="checkbox"/> R100	<input type="checkbox"/> R101
<input type="checkbox"/> R100	<input type="checkbox"/> R104
<input type="checkbox"/> R100	<input type="checkbox"/> R107
<input type="checkbox"/> R100	<input type="checkbox"/> R110
<input type="checkbox"/> R100	<input type="checkbox"/> R113
<input type="checkbox"/> R100	<input type="checkbox"/> R116
<input type="checkbox"/> R100	<input type="checkbox"/> R119
<input type="checkbox"/> R100	<input type="checkbox"/> R122
<input type="checkbox"/> R100	<input type="checkbox"/> R125
<input type="checkbox"/> R100	<input type="checkbox"/> R128

4. The list below states choices that must be made between two sums of money on a specific day. The task is to choose the preferred option between each of the 10 choices below. The first ten show an amount of money for a 301 day wait and the second column a 308 day wait for a larger amount.

The choices need to be made as if you will receive the money on the given day as per your choice.

301 days later	308 days later
<input type="checkbox"/> R100	<input type="checkbox"/> R101
<input type="checkbox"/> R100	<input type="checkbox"/> R104
<input type="checkbox"/> R100	<input type="checkbox"/> R107
<input type="checkbox"/> R100	<input type="checkbox"/> R110
<input type="checkbox"/> R100	<input type="checkbox"/> R113
<input type="checkbox"/> R100	<input type="checkbox"/> R116
<input type="checkbox"/> R100	<input type="checkbox"/> R119
<input type="checkbox"/> R100	<input type="checkbox"/> R122
<input type="checkbox"/> R100	<input type="checkbox"/> R125
<input type="checkbox"/> R100	<input type="checkbox"/> R128

5. Through hard work you will receive a bonus from your employer and you have the option to choose from the following 2 choices taking into consideration the time of the payment.

Please select the preferred option between R50,000 and R60,000 taking into consideration the time aspect of receiving R50,000 now or R60,000 in one month's time from today.

R50,000	R60,000
<input type="checkbox"/> Today	<input type="checkbox"/> 30 days

6. Through hard work you will receive a bonus from your employer and you have the option to choose from the following 2 choices taking into consideration the time of payment.

Please select the preferred option between R100,000 and R120,000 taking into consideration the time aspect of receiving R100,000 in 12 months' time or R120,000 in 13 months' time from today.

R100,000 \_\_\_\_\_ R120,000  
 12Months  13Months

7. Through hard work you will receive a bonus from your employer and you have the option to choose ONLY ONE from the following 4 choices taking into consideration the time of payment.

R50,000 \_\_\_\_\_ R60,000 \_\_\_\_\_ R100,000 \_\_\_\_\_ R120,000  
 Today  30 Days  12 Months  13 Months

Please explain your reasoning for answer to question 7: (optional)

A text input field with a scroll bar and a vertical scrollbar, intended for providing optional reasoning for the answer to question 7.

8. You operate in a highly pressurised, target-driven environment and have stock in surplus of a high quality, high value product.

Which of the following discount options will you take to sell the stock in terms of either immediate discount or discount over the next few months, taking into consideration not all the stock might get sold over the time period selected?

Discount 20% \_\_\_\_\_ Discount 10%  
 Today  1 Month

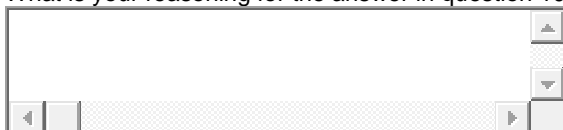
9. As per the previous question, which one of the following discount options will you take to sell the stock in terms of either immediate discount or discount over the next few months, taking into consideration not all the stock might get sold over the time period selected?

Discount 5% \_\_\_\_\_ Discount 2.5%  
 3 Months  6 Months

10. As per the two previous questions you need to sell surplus stock and have the following options. Sales of the products are crucial.

Discount 20% \_\_\_\_\_ Discount 10% \_\_\_\_\_ Discount 5% \_\_\_\_\_ Discount 2.5%  
 Today  1 Months  3 Months  6 Months

What is your reasoning for the answer in question 10: (optional)

A text input field with a scroll bar and a vertical scrollbar, intended for providing optional reasoning for the answer to question 10.

**11. You plan to acquire a company whose share price is increasing steadily due to successful business practices. With no further information available at the time, what would you choose to pay knowing that you will take on large debt through financing the deal?**

R800million \_\_\_\_\_ R900million  
 Today  3 Months

**12. As per the previous question, what would you choose to pay for the business over the time periods given knowing that you will take on large debt through financing.**

R1.2billion \_\_\_\_\_ R1.3billion  
 12 Months  15 Months

**13. As per the previous questions, given the time frame what would you choose to pay knowing that you will take on large debt through financing the deal?**

R800million \_\_\_\_\_ R900million \_\_\_\_\_ R1.2billion \_\_\_\_\_ R1.3billion  
 Today  3 Months  12 Months  15 Months

Explain your reasoning to the answer in question 13: (optional)



**14. You plan on acquiring a company whose share price is declining sharply but the acquisition will give you a competitive edge in the market. You have to decide whether to buy it now for R900 million or in 3 months for R800 million. Again the deal is financed through debt.**

R900million \_\_\_\_\_ R800million  
 Today  3 Months

**15. As per the previous question, you have to decide whether to buy the company in 12 months for R600 million or in 15 months at R500 million. Again the deal is financed through debt.**

R600million \_\_\_\_\_ R500million  
 12 Months  15 Months

**16. As per the previous questions, you have to decide whether to buy the company taking into consideration cost and time frame. Again the deal is financed through debt.**

R900million \_\_\_\_\_ R800million \_\_\_\_\_ R600million \_\_\_\_\_ R500million  
 Today  3 Months  12 Months  15 Months

Explain reasoning to the answer in question 16: (optional)



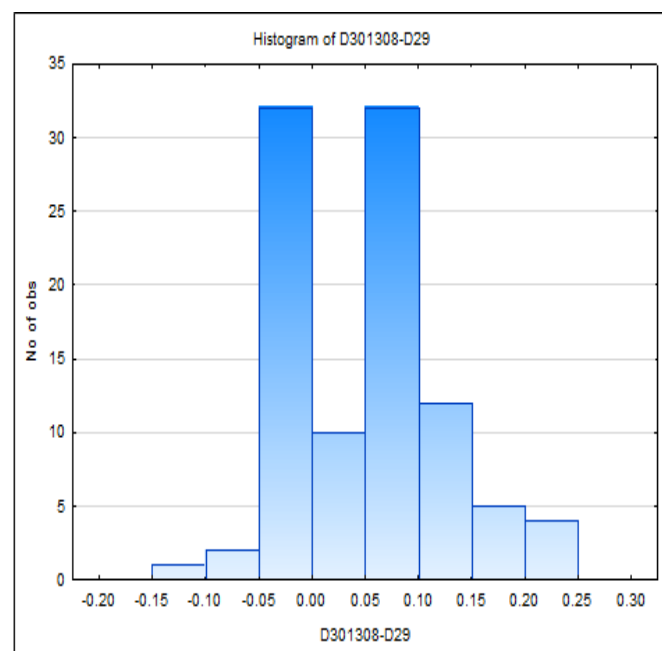
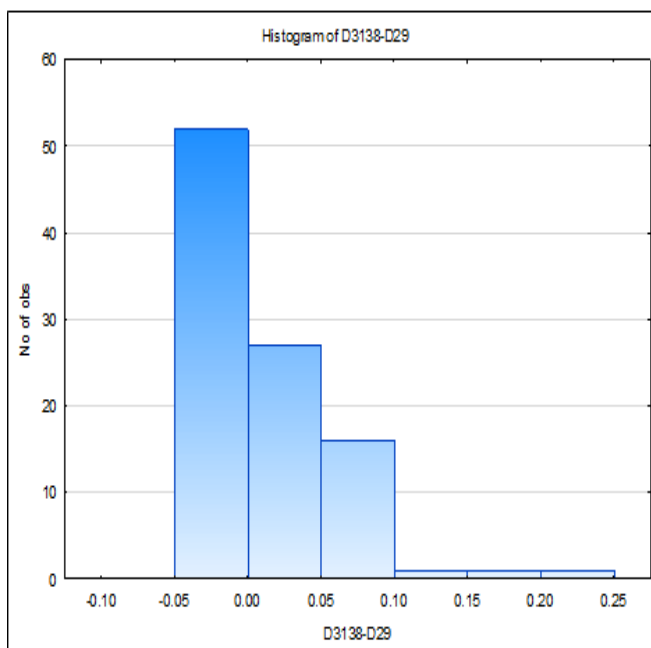
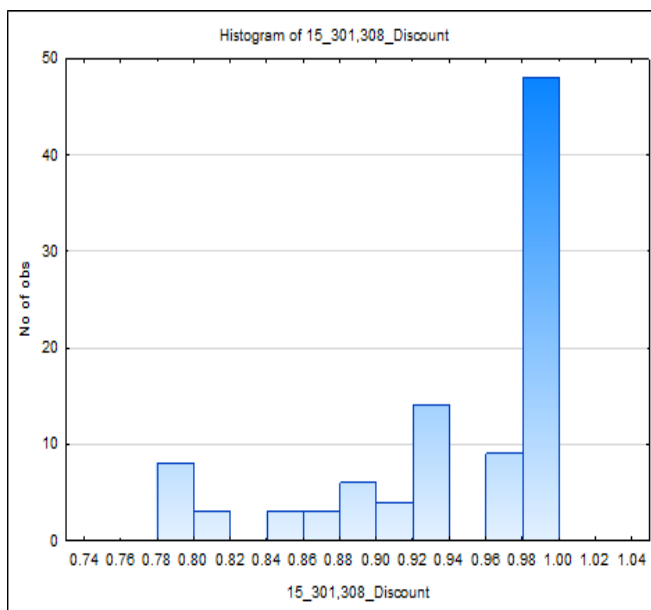
**Additional Information:**

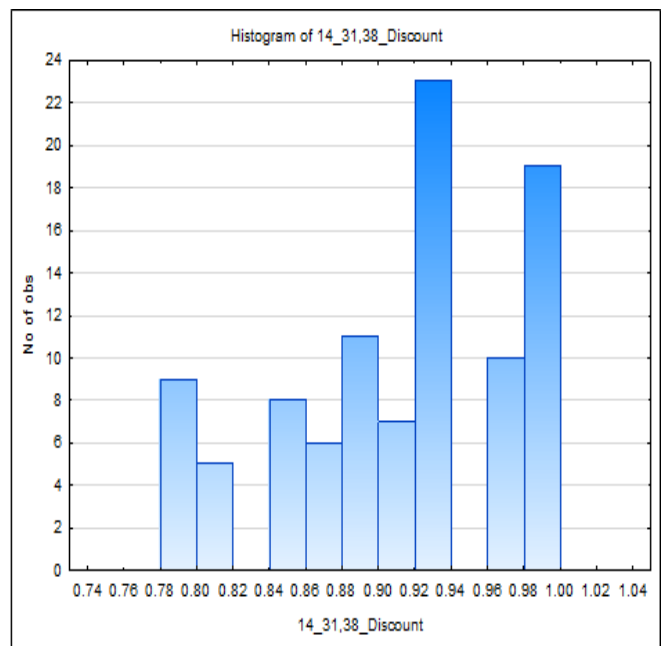
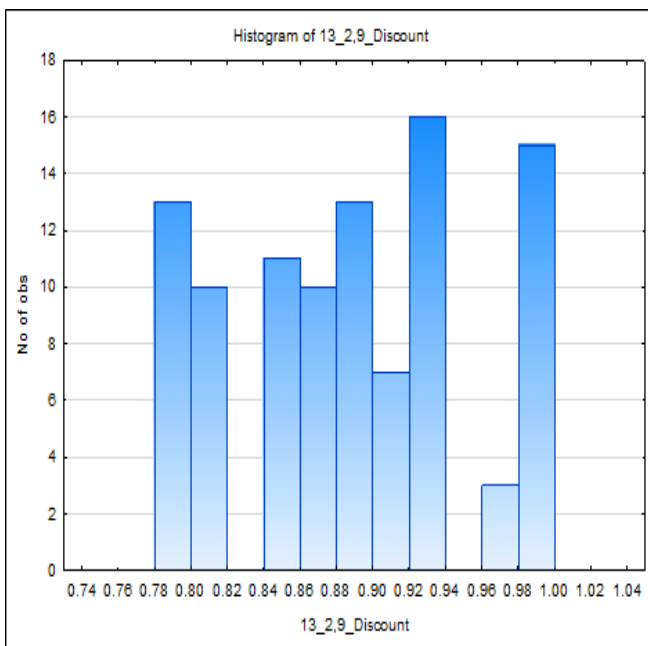
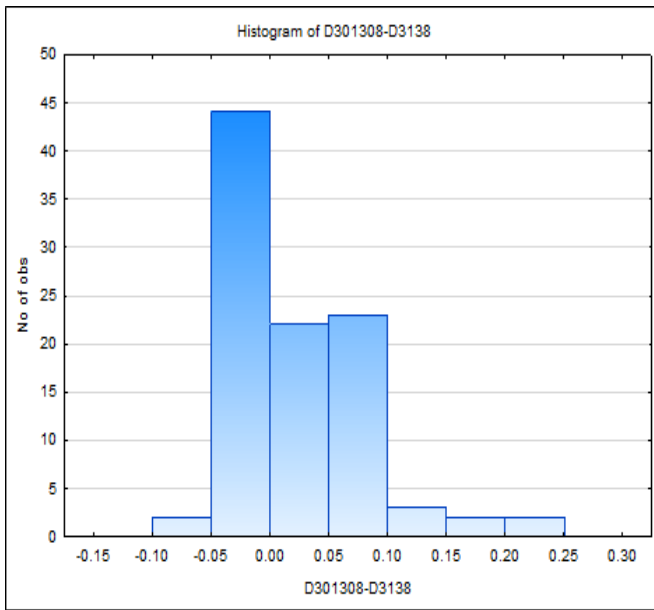
Data analysis was carried out in STATISTICA.

Citation: StatSoft, Inc. (2011). STATISTICA (data analysis software system), version 10. www.statsoft.com.

The 5% significance level was used throughout, unless specified otherwise.

*In other words, tests or parameters with a p-value <0.05 are significant.*





**Data cleaning and preparation**

Data file as received: Sheet1V2.xls → MG data v1.xls

Data file for analysis: MG data v1.sta

Note than for both RQ1 and RQ2, when we use a non-parametric test, we are comparing medians, and not means.

		Bonus for hard work				Selling Excess stock under pressure			
		Illogical Choice from SC1 to Sc3	Illogical choice from SC2 to SC3	Hyperbolic disc on sc1/2	Hyperbolic Discount SC 3	Illogical Choice from SC1 to Sc3	Illogical choice from SC2 to SC3	Hyperbolic disc on sc1/2	Hyperbolic Discount SC 3
<b>Total Count</b>	<b>98</b>	1	2	3	17	8	2	-	5
<b>Count overlap with 64</b>	<b>64</b>	1	2	2	13	7	1	0	1
Percent of 98		1%	2%	3%	17%	47%	12%	0%	29%
Percent of 64		2%	3%	3%	20%	54%	8%	0%	8%
Percent of HD		100%	100%	67%	76%	88%	50%	#DIV/0!	20%

		Acquisition Of Growing Company				Acquisition of Ailing Company			
		Illogical Choice from SC1 to Sc3	Illogical choice from SC2 to SC3	Hyperbolic disc on sc1/2	Hyperbolic Discount SC 3	Illogical Choice from SC1 to Sc3	Illogical choice from SC2 to SC3	Hyperbolic disc on sc1/2	Hyperbolic Discount SC 3
<b>Total Count</b>	<b>98</b>	-	2	11	8	1	3	1	14
<b>Count overlap with 64</b>	<b>64</b>	0	1	7	8	0	3	1	10
Percent of 98		0%	2%	11%	8%	1%	3%	1%	14%
Percent of 64		#REF!	2%	11%	13%	0%	5%	2%	16%
Percent of HD		#DIV/0!	50%	64%	100%	0%	100%	100%	71%



Assumptions:

1. Independent random samples
2.  $N_a P_a = \text{Count Cell AA} = 12 \geq 10$
3.  $N_a(1-P_a) = \text{Count Cell AB} = 22 \geq 10$
4.  $N_b P_b = \text{Count Cell AB} = 24 \geq 10$
5.  $N_b(1-P_b) = \text{Count Cell AB} = 42 \geq 10$

Conclusion: All assumptions except 1 are met.

Variable	Valid N	Mean	LCL for	UCL for	Median	Minimum	Maximum	Lower
			Mean	Mean				Quartile
13_2,9_Discount	98	0.887	0.874	0.901	0.885	0.781	1.000	0.840
14_31,38_Discount	98	0.911	0.897	0.924	0.935	0.781	1.000	0.862
15_301,308_Discount	98	0.944	0.930	0.958	0.962	0.781	1.000	0.909
D3138-D29	98	0.024	0.016	0.032	0.000	-0.050	0.219	0.000
D301308-D29	98	0.057	0.043	0.070	0.065	-0.121	0.219	0.000
D301308-D3138	98	0.033	0.023	0.043	0.024	-0.094	0.219	0.000

Upper Quartile	Std.Dev.	Skewness	Kurtosis	z(skew)	z(kurtosis)	p-value for S-W test for normality
0.935	0.067	0.159	-1.017	0.64	-2.05	0.0003
0.962	0.066	-0.373	-0.852	-1.51	-1.72	<0.0001
1.000	0.069	-1.083	-0.030	-4.38	-0.06	<0.0001
0.047	0.040	1.825	5.450	7.38	11.01	<0.0001
0.094	0.068	0.322	0.061	1.30	0.12	0.0027
0.065	0.051	1.215	2.905	4.91	5.87	<0.0001