Better than average:
An investigation of overconfidence in South Africa

By

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I hereby declare that I have read and understood the regulations governing the submission of Master of Commerce dissertations, including those relating to length and plagiarism, as contained in the rules of the University, and that this dissertation conforms to those regulations.

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Abstract

This dissertation examines overconfidence in an investing environment to determine if there is evidence of the phenomenon amongst a sample of academics at participating universities.

A survey was sent out to over 6 000 staff members at four South African universities assessing respondents' ability to estimate their return earned in unit trusts in which they were invested, as well as assessing whether they would adjust their estimate when presented with an anchor (the relevant JSE All Share Index return). 466 completed responses were obtained, of which 81 respondents indicated that they were invested directly in a South African equity unit trust to allow for statistical testing. The data obtained were analysed for evidence of overconfidence and anchoring by comparing respondents' estimates of fund returns against historical returns and then checking whether they adjusted their estimate after being presented with an anchor.

It was found that investors were under-confident rather than overconfident with women giving lower, and thus more under-confident estimates than their male counterparts. Furthermore, it was found that older respondents were better able to estimate their past returns than younger respondents. The presence of an anchor appeared to have no effect on respondents' estimates.

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Introduction

Overconfidence has the ability to affect investment decisions through incorrect thought processes and incorrect belief in one's own abilities. Previous studies (notably Glaser and Weber (2007)) have set out how overconfidence affects an individual's abilities to estimate their past equity returns. The purpose of this dissertation is to determine whether or not overconfidence, and other behavioural biases, affect investors abilities to estimate their historic returns.

Relevant literature will be reviewed in chapter 2, starting with an understanding of behavioural biases. This field will then be further investigated to determine which behavioural biases have the most important instances of effect on an individual's abilities to estimate historic equity returns and how these biases affect thought processes.

The findings from the literature review will inform the research questions which will be stated in chapter 3. The research questions have the objective of determining whether overconfidence is prevalent among investors surveyed. The research approach will be discussed with an explanation of the data sourced for the investigations. The methods applied to the data will also be explained.

In chapter 4, the results of the application of the methods to the data will be presented. These will be described and discussed in detail. Where possible, relevant literature will be referenced in order to offer explanations for any notable findings. Any particular observations that merit additional investigation will be further analysed and the results thereof discussed.

Chapter 5 will set out the resultant conclusions based on the results of chapter 4 and the literature reviewed in chapter 2. Areas offering scope for further study will also be set out.

Literature Review[1]

"Over their lifetime, people base thousands of decisions on impressions of their skill, knowledge, expertise, talent, personality, and moral character" (Dunning et al., 2004). If these decisions are based on incorrect impressions of our skill, knowledge, expertise and talent we may end up making the wrong decisions, not as a result of our poor decision-making ability, but rather because of the behavioural biases that affect our impressions of how much we think we know.

Traditional finance models are based on utility theory as well as arbitrage assumptions that form the basis of the efficient market hypothesis (EMH) (Ritter, 2003). Behavioural biases are those factors that traditional models are unable to explain when looking at market returns and reactions. Ritter (2003) points out that there are errors in the ways that people think, act and process information and these errors are what lead to the traditional models being unable to explain certain market events. Behavioural finance uses models where some participants are not fully rational, either because of the beliefs that they hold or due to preferences. In contrast to the EMH, which assumes that markets will form an unbiased view of the future, behavioural finance assumes that markets are sometimes not information efficient.

Certain cognitive biases have been identified, such as heuristics (Ritter, 2003), overconfidence (Barber & Odean, 2001), mental accounting (Shefrin & Statman, 1984) , framing (Tversky & Kahneman, 1986), representativeness (Kahneman et al., 1982), conservatism (Greenwood & Nagel, 2009), and the disposition effect (Ritter, 2003) which all lead to investors behaving irrationally (Ritter, 2003). There is another limitation to traditional models, as identified by Ritter (2009), namely limits to arbitrage opportunities. Firstly, if the events that allow arbitrage are once-off it is very difficult to make money off the trades owing to their unpredictability. If the events are recurring, then other market participants step in to take advantage of these opportunities and erode the advantage away (Ritter, 2010). Thus to continue making profits off these opportunities, the investor needs to become more and more leveraged which, as was proved by Long Term Capital Management (Jorion, 2000), is not sustainable. All these factors have contributed to behavioural finance becoming a more widely researched area.

Research from numerous corners of psychological inquiry (Wegerif et al., 1999; Williams & Gilovich, 2008; Nisbett & Ross, 1980; Plous, 1995; Kahneman & Tversky, 1982) suggests that self-assessments of skill and character are often flawed. These flaws can be substantive (those biases that are independent of us) and

[1] Extracts from this chapter have been compiled as a conference paper as yet unpublished at date of submission. These extracts have not been separately identified throughout the chapter.

systematic (the process that we follow to make our decisions (Barber & Odean, 2001; Dunning et al., 2004)). The results show that, in general, peoples' self-views hold only a tenuous to modest relationship with their actual behaviour and performance (Dunning et al., 2004). The correlation between how people rate their own skill and actual performance in many aspects is "moderate to meagre" (Dunning et al., 2004). Epley and Dunning (2000) found that at times, other people's predictions of the participant's skill were more accurate than the participant's own prediction. In addition to incorrect self-rating, people overrate themselves relative to their skill and performance level. The average person believes that they have an 'above average' level of skill and performance which defies simple mathematical probability as only half of a population can have an above average level of skill (College Board, 1977). Furthermore, people "over-estimate the likelihood that they will engage in desirable behaviours and achieve favourable outcomes, furnish overly optimistic estimates of when they will complete future projects, and reach judgments with too much confidence" (Dunning et al., 2004). Epley and Dunning (2006) found that people fall prey to biases that leave their self-assessments flawed in systematic ways, from the start of their thought process to their final decisions, which carry significant implications such as wrong decisions and incorrect views of themselves.

There are several psychological processes, as mentioned above as cognitive biases, at play, that produce these vastly flawed self-assessments. A quote from Benjamin Franklin highlights the fact that it has always been notoriously difficult to produce unbiased self-assessments: "There are three things extremely hard: steel, a diamond, and to know one's self" (Franklin, 1750).

This literature review will set about looking at the behavioural biases that affect the decisions and estimates' made of an individual's self-performance. These are most notably: overconfidence (Barber & Odean, 2001), anchoring (Switzer III & Sniezek, 1991), representativeness (Kahneman et al., 1982), conservatism (Switzer III & Sniezek, 1991), the 'better than average' effort (Landier & Thesmar, 2008), information deficits and lack of feedback and socialisation (Dunning et al., 2004), as identified by existing literature. Each bias will be individually investigated to gain a better understanding as to how it affects an individual's views of their own performance and an individual's prediction of their performance going forward.

Overconfidence

Overconfidence influences an investors propensity to trade frequently yet unsuccessfully (Bailey et al., 2011), which is largely due to the fact that they overrate their knowledge and abilities and are overly

optimistic about future prospects (Fischhoff, Slovic & Lichtenstein, 1977; Tourani-Rad & Kirkby, 2005, Fischhoff et al., 1977). In a study by Alpert and Raiffa (1982) it was found that the confidence intervals that individuals assign to situations are far too narrow; their 98% confidence interval included the true quantity only 60% of the time. Additionally, people are poorly calibrated when it comes to estimating the probability of an event occurring. In a study by Fischhoff et al. (1977), events that individuals thought were certain only happened about 80% of the time and events that individuals deemed impossible occurred 20% of the time.

Individuals see events and issues through the view of their political ideology, individual and group history and interests as well as their own desire to see themselves in a positive light (Lin, Pronin & Ross, 2002). Individuals fail to see that their own 'objective views' of events that they are not involved in are not completely objective because of the fact that they are looking at circumstances through the lens of their own unique past experiences (Pronin, Lin, et al., 2002). However, individuals feel that because of their own past experiences they are better suited to the situation as they have more insight as opposed to having more biases (Pronin, Lin, et al., 2002). Lin et al. (2002) argue that many individuals agree with the psychological findings relating to these biases, however, what individuals fail to see is how these biases play a role in their own judgements and inferences. This asymmetry in perceptions has been termed "naive realism" (Griffin & Ross, 1991; Pronin, Puccio & Ross, 2002; Ross & Ward, 1995) and states that individuals assume that their own take on the world is authentic without giving it much thought. When others do not take the same view on the issue, individuals search for an explanatory reason and the most often arrived at explanation is that others' views are subject to some bias and this stops them from reacting as the situation demands (Pronin, Lin, et al., 2002). In using the explanation that others' biases are the reason for the difference in views in the situation, individuals fail to recognise their own perceptions and reactions as being biased (Pronin, Lin, et al., 2002). This leads individuals to have more faith in their own insights and to be overconfident about them. Even after having read descriptions of biases that subjects had displayed during an interview, the individuals denied that their self-assessments were subject to these biases but confirmed that others displayed these biases (Pronin, Lin, et al., 2002).

Odean (1999) looked at the overconfidence of traders and found that traders who trade most frequently are often the worst performers. The average net return of traders who trade frequently was 7.1% lower than the return made by investors who traded infrequently (Barber & Odean, 2000). Furthermore, overconfident investors tend to hold undiversified portfolios indicating that a lack of diversification was an investor choice and not as a consequence of institutional factors such as trading costs (Odean, 1998;

Baker & Nofsinger, 2002). Odean (1998) further showed that this lack of diversification was owing to an investors unjustified belief in that stock, which meant that the investor held more of the stock than a rational investor would have.

Male investors have been found to exhibit overconfidence (Bailey et al., 2011) to a greater extent than females (Barber & Odean, 2001) and inexperienced investors have been found to be more prone to optimism (Greenwood & Nagel, 2009). Furthermore, self-assessments of skill and character tend to be more inaccurate than people suspect leading to overconfidence (Dunning et al., 2004). Dunning et al. (2004) found that most people only have a modest level of insight into the skills that they possess and character traits that they have. All these factors contribute to the incorrect view that individuals hold of themselves.

Daniel, Hirshleifer and Subrahmanyam (1998) point out that overconfidence about private signals (information that is not commonly known to the market and has been found from a private source) can cause an overreaction to information; whilst self-attribution (attributing success to competence and failures to bad luck) maintains overconfidence in individuals. This maintained overconfidence allows prices (of stocks) to continue to overreact to information in the market place. These private signals and self-attribution biases will lead investors to overestimate their returns and continue to do so until those private signals are refuted. Daniel et al. (1998) found that wealthier investors suffer less from this self-attribution bias than their less well-off counterparts.

Dunning et al. (2004) further found that people place too much confidence in the insightfulness of their judgements. They overestimate the likelihood that their judgements of the present are correct and that their predictions about the future will prove true. Fischhoff, Slovic and Lichtenstein (1977) found that college students who took a general knowledge quiz overestimated the probability that their own answers were correct. This phenomenon was observed again three years later when Cambridge and Shreckengost (1978) conducted research at the Central Intelligence Agency which showed that the analysts at the CIA overestimated the accuracy of their own predictions about future world events.

Dunning et al. (2004) proposed that the reason for this overestimation of relative performance is that people often lack the critical information that they need to make fair comparisons with others. Dunning et al. (2004) also found that there is information available to help in their comparison, but that this valuable information is either ignored or not sought out. In studies done by Festinger (1954) and Suls, Martin, Wheeler, Suis and Martin (2002) it was found that people prefer to know how they compare

against their peers, rather than against objective standards, as comparisons to peers affect people's behaviour more (Klein, 1997). By comparing themselves to peers, individuals modify their behaviour and actions more readily than they do if they simply compare themselves against an objective standard.

When looking at future events to determine what the expected outcome will be, people tend to follow a "natural and simple psychological strategy" (Dunning et al., 2004). They will consider some future event, scenario or action and determine as many scenarios as possible that could produce the desired outcome. When these scenarios seem plausible, Kahneman and Tversky (1982) found that people tend to be overconfident about the likelihood of the outcomes taking place. People tend to make overly optimistic, and sometimes overly pessimistic, predictions about the future because they fail to consider the fact that they are unaware of all the details of the future and that the outcomes are often unpredictable (Read & Van Leeuwen, 1998). Situational features are difficult to predict in other ways because people struggle to determine how they will react under certain circumstances. The situations that people tend to struggle with most are those that have "significant emotional or visceral components" (Read & Van Leeuwen, 1998). These components often result in people being overly optimistic about predictions or sometimes pessimistic for the same reasons. In Read and Van Leeuwen's 1998 study, they asked office workers who had just eaten a substantial lunch to predict what snack they would want delivered to them at 4 PM in a week's time. Most people said that they would prefer to have a healthy snack (such as an apple) delivered rather than a more filling snack (such as a candy bar) even though they intellectually knew that they tend to be hungry at that time of the afternoon. A week later, when both snacks were delivered, more of the workers chose the unhealthy candy bar over the healthy snack that they had predicted they would choose, showing that the workers were unable to judge their own needs and were influenced by immediate circumstances rather than previous insights. It could thus be expected that even with prior consideration, an individual could change their estimate given their current circumstances and frame of mind.

Other causal factors have also been found to contribute to overly optimistic predictions. People tend to neglect important information that they have on hand when making predictions (Read & Van Leeuwen, 1998) owing to their behavioural biases. When people predict how they think they will behave or react in certain circumstances; they tend to dwell on the positives of the scenario and fail to consider the worst-case scenarios that could easily be generated (Newby-Clark et al., 2000). Another causal factor is that people often neglect their own past experience when making decisions, which is often the most relevant information (Dunning et al., 2004).

In a workplace-specific study done by Dunning et al. (2004) it was found that the overly optimistic views held by individuals of their perceived abilities and promotional opportunities are only modestly related to their actual abilities and promotional opportunities. With this in mind, Dunning et al. (2004) points out that these biases affect performance evaluation. Furthermore, it is shown that what organisations fail to recognise is that routines and procedures can be adopted to keep these biased self-views from affecting performance in many situations and that these procedures and routines could be used by individuals to produce more accurate self-assessments (Dunning et al., 2004). More accurate self-assessments would help investors to be aware of behavioural biases and this would be witnessed by more accurate estimates of self-performance (Dunning et al., 2004).

The engineering profession has developed a method to guard against overconfidence as safety is such an important aspect to their profession. When engineers calculate how much concrete is required to build a dam wall, or how much material will be needed to build an aeroplane wing, any miscalculation on the underside can have a serious effect on public safety. Therefore the profession has built in a mechanism whereby they incorporate 'safety factors' (Heath, Larrick & Klayman, 1998). Once the amount of concrete or material has been calculated, they are required to multiply this amount by a factor of between 3 and 8, effectively tripling, or more, the required amount of concrete and material. Thus, even though engineers suffer from overconfidence like all individuals, they have developed a strategy that helps to rule out the incorrect judgements made by this bias (Heath, Larrick & Klayman, 1998).

Thus far the focus has been on the negative aspects of overconfidence, but Landier & Thesmar (2008) found that it does have some positive effects. Landier & Thesmar (2008) showed that during the early stages of their businesses, overconfident entrepreneurs worked harder to find customers and research technology in comparison to those who were not overconfident. However, on the negative side of overconfidence, entrepreneurs who were overconfident were more likely to ask friends and family for funds to start their business as opposed to obtaining a bank loan. When they did obtain a bank loan they tended to rely on short term financing to fund the business as opposed to borrowing long term which may have been more beneficial. This decision by the entrepreneur gave them better control of their finances in the short term but exposed them to a much greater risk in the long term.

Another benefit of overconfidence is that in the most severe and stressful of psychological circumstances, those people who exhibited overconfidence recover better (Taylor, Lichtman & Wood, 1984). Women facing a life-threatening disease, such as breast cancer, show the most psychological adjustment when they display unnatural levels of optimism (Taylor et al., 1984). Similarly, civil war veterans or people

struggling with the loss of a loved one tend to recover better when they overrate themselves (Bonanno, Field, Kovacevic & Kaltman, 2002). However, in less extreme circumstances, as is more often the case (Landier & Thesmar, 2008), the evidence discussed above suggests that overconfidence is not helpful.

Thus far the focus has also been on overconfidence as a single bias, however, Barberis and Thaler (2003) point out that overconfidence as a bias may stem from two other behavioural biases: self-attribution bias and hindsight bias. Self-attribution bias, is a person's tendency to attribute any success that they may have to their own talent and good choice whilst ascribing any failure to bad luck rather than bad decisions and incompetence (Barberis & Thaler, 2003). When people do this repeatedly, they come to the incorrect conclusion that they are in fact very talented when this is often not the case (Barberis & Thaler, 2003). Gervais and Odean (2001) point out that when an investor has a few successful quarters they may become overconfident in their own abilities. Hindsight bias happens when people believe that they predicted an event before it happened (Barberis & Thaler, 2003). If people begin to believe that they have been able to predict the past better than they actually did, then there is a strong possibility that they will start to think that they can predict the future better than they actually can (Barberis & Thaler, 2003). This will lead to greater self-attribution bias as well as a higher level of overconfidence (Barberis & Thaler, 2003).

In a study by Ulrike Malmendier and Diversif (2005) it was found that CEOs of large US corporations were found to be under-diversified, which shown earlier is as a result of overconfidence (Baker & Nofsinger, 2002). These CEOs were investing human capital into the business by working there as well as having a large part of their salary in the form of stock and stock options. Thus, even moderate risk aversion would predict that CEOs should diversify their portfolios (Malmendier & Tate, 2005). Other CEOs additionally purchased stock in their own company at the same time as they were holding stock options. Ulrike Malmendier and Tate (2005) did not find any evidence that these CEOs earned abnormal returns on their portfolios by holding shares in their own company. A possible conclusion to reach from this is that CEOs have an overconfident view of themselves and the effect that they will have on their company's share price and thus hold an undiversified portfolio in the belief that they will outperform the market.

In conclusion, investors are overconfident, men more so than their female counterparts. This overconfidence will lead an investor to overestimate the returns that they have generated. Furthermore, they will trade more than the rational investor would, translating into a lower return earned. This overconfidence can come from various biases such as self-attribution and hindsight bias, although there is evidence to suggest that the wealthier an investors becomes, the less prone they are to self-attribution.

Furthermore, self-ratings and reviews are not very accurate, which enables the manifestation of overconfidence.

Anchoring

Anchoring is the bias that people exhibit when they form a decision, base a statement or make an estimate based on some initial, possibly arbitrary, value (Barberis & Thaler, 2003; Kahneman & Tversky, 1982). In other words, people anchor a decision based on an initial base. Judgements made where the anchoring bias is present occur when individuals use some available quantitative information as a starting point, known as "the anchor", and then adjust the anchor up or down to arrive at a judgement (Switzer III & Sniezek, 1991).

Anchoring has been described as one of the original three decision making heuristics (Kahneman et al., 1982) and its effects have been documented in such wide areas as real estate valuation (Northcraft & Neale, 1987), effort and task motivation (Switzer III & Sniezek, 1991) as well as consumer purchasing decisions (Wansink et al., 1998). Research by Northcraft and Neale (1987) among others (Englich et al., 2006) has shown that even experts are subject to anchoring bias. Anchoring is a central part of explanations for a number of diverse events (Wilson et al., 1996) ranging from why people make conservative judgements of probability (Edwards, 1968; Slovic & Lichtenstein, 1971), believe that events that occurred in the past were inevitable (Fischhoff, 1975), and believe false information (Gilbert, 1991).

Switzer III and Sniezek (1991) showed that treating the anchoring and adjusting bias as a general-purpose contingency-judgement mechanism leads to counterintuitive hypotheses. Switzer III and Sniezek (1991) pointed out that if anchoring and adjusting is a general-purpose contingency-judgement mechanism then the mere presence of random numbers could be used to manipulate performance. However, Switzer III and Sniezek (1991) went on the show that the presence of random numbers only has the above effect where judgment in task performance is required and not in all tasks as the person performing the task needs to pay sufficient attention to the anchor (Wilson et al., 1996).

There are a number of theories as to how individuals integrate the initial arbitrary number into their judgement, known as the integration adjustment processes (Wilson et al., 1996). Lopes (1985) stated the initial numbers may be averaged, Kahneman and Tversky (1982) stated there may be insufficient adjustment and Quattrone, Lawrence, Finkel and Andrus (1984) stated there may be an adjustment until people are just within the range of plausible values. Wilson et al., (1996) referred to this as the integration and adjustment process.Kaustia, Alho and Puttonen (2008) performed controlled tests on 300

Scandinavian financial advisers where the advisers were asked about their stock market expectations while the information provided to them was changed. The study looked at the effect that historical data had on forming expected returns. In the first experiment (Kaustia et al., 2008) advisors were provided with the real average return of European stocks over the last century of 4.5%. The average expectation of the stock market return over the next 20 years was projected to be 4.6%. In comparison to this, when advisors weren't presented with the historical return they estimated that returns over the next 20 years would be 3.4% higher than those who had been given the historical return. When advisors were asked whether their knowledge of past returns had affected their estimate of future returns, those that said they hadn't had the same strong grouping around the 4.5% historical return as those advisors who said that the historical return had a strong influence on their estimate (Kaustia et al., 2008).

Kahneman, Slovic and Tversky (1974) suggest that the anchoring effect is an unconscious cognitive process. The individual may feel that their estimate is not influenced by an anchor, but in reality they are (Wilson et al., 1996).

In an experiment by Kahneman and Tversky (1982), individuals were asked to estimate the percentage of countries belonging to the united nations that were African. To test the anchoring bias, they asked the subjects if their number was higher or lower than a randomly generated number between 0 and 100. Those subjects given the number 10 subsequently had an average estimate of 25% while those given the number 60 subsequently had an average estimate of 45%. This showed that if subjects have an initial number to base their estimates off, that it would affect their estimate.

The above literature points towards a bias that affects the way in which people make estimates or assumptions about given scenarios. These situations can be areas where individuals are experienced or completely new to the subject (Kaustia et al., 2008). Anchoring has the potential to affect every decision that an individual makes, however, Kaustia et al. (2008) found that experience significantly reduces behavioural biases when comparing test results from students to those of experienced professionals. Kaustia et al. (2008) showed that anchors can play a significant role in individual's estimation of their past returns.

Representativeness and Conservatism

The representativeness heuristic occurs when people try to evaluate the probability of A being true based on the closeness that A resembles B and the probability that B is true (Kahneman & Tversky, 1982). Representativeness is a helpful heuristic most of the time (Kahneman & Tversky, 1982) as many

judgements that we make every day are done so based on our past experiences. The following example by Kahneman and Tversky (1982) however, shows that this is not always the case:

"Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations."

When subjects were asked which of "Linda is a bank teller" (statement A) and "Linda is a bank teller and is active in the feminist movement" (statement B) is more likely, subjects' assigned greater probability to B. Representativeness provides a simple explanation for this. The description of Linda *sounds* like the description of a feminist – it is representative of a feminist – leading subjects to pick B."

If investors have had some recent information from the stock market or recent feedback regarding performance then it is possible that they can take this feedback and construe that because they perhaps performed well in the last period that they have always performed well (Kahneman & Tversky, 1982). Additionally, when they know of a few shares that are doing well, they could be led to the conclusion that because those shares are doing well that all of their shares must be doing well and hence they must have received a good return on their investment as a whole, which is not a representative judgement to make (Kahneman & Tversky, 1982).

Another bias that representativeness generates is sample size neglect (Barberis & Thaler, 2003). When people look at a sample size and draw conclusions off that sample they neglect the fact that bigger sample sizes are more reliable and robust than smaller sample sizes. If a coin is tossed four times and on two occasions, the result is heads and the other two, the result is tails; it will be representative of a coin toss of 10 000 where there were 5 000 heads and 5 000 tails. However, people find that the two sets of tosses are equally informative when in fact, the second set of tosses is much more so (Barberis & Thaler, 2003).

Sample size neglect has the effect of people inferring results from a sample size where they do not initially know the data-generating process. Thus, an analyst with four good stock picks could be promoted on grounds of good performance and talent when in actual fact the stock picks are not representative (Gilovich, Vallone & Tversky, 1985). This belief that a small sample will be representative of the larger population is known as the law of small numbers (Charness & Rabin, 2002). In instances where people do know the data-generation process they can fall prey to the gambler's fallacy: if coin tosses produce five heads in a row, people would say that a tails is due as they believe that even a small sample should be representative of the population (Barberis & Thaler, 2003). This leads individuals to have more confidence

in their own projections than an objective individual would have, and they are thus more prone to overconfidence (Barberis & Thaler, 2003).

When comparing the effect of representativeness compared to conservatism, representativeness leads to the underweighting of the base rate and conservatism leads to the over-emphasis of the base rate relative to the sample size (Barberis & Thaler, 2003). In an experiment run by Edwards (1968), different coloured balls were placed into two urns and subjects were asked to estimate the probability that a certain set of balls could have come from the first urn. Most of the subjects estimated a probability of around 0.7 while the true probability was 0.97, thus the subjects had all been over emphasising the base rate of 0.5.

It can thus be seen that, depending on whether individuals are prone to representativeness or conservatism, a different reliance would be placed on the base weighting of the benchmark for their portfolio.

Better than Average Effect

People tend to believe that they are better than average (Landier & Thesmar, 2008); a view which violates simple mathematical probability as not more than half of a group can be above average (Landier & Thesmar, 2008). In a study over one year (1976-1977) of more than one million high school seniors, 70% of the students believed that they had above average leadership skills and only 2% of the same sample believed that their leadership skills were below average. In the same study, students were asked to rate themselves relative to their peers with respect to how well they got along with others. Nearly all the respondents rated themselves as at least average, 60% of the students said that they were in the top 10%, and 25% of the students believed that they were in the top 1% (Dunning, 1999).

This 'better than average effect' does not only apply to students: Rutter, Quine and Albery (1998) found that most motor cyclists believed they were less likely than the average biker to be in an accident. Similarly, 94% of professors stated that they did above average work (Cross, 1977). In studies by Gigerenzer (2004) and Lin et al. (2002) it was found that along with people being overconfident about their abilities they were also overconfident about how accurately they were able to self-assess their abilities. Individuals stated that they were more likely than their peers to provide accurate self-assessments. Wagenaart and Loftus (1988) found that lawyers overestimate their chances of winning cases that are about to go to court while Odean (1998) found that stock pickers think that the stocks that they pick are more likely to end up winners than those of the average investor.

Dunning et al. (2004) also raised the problem of how competence is defined and showed that the reason people have an incomplete knowledge of their skills and competence is that it is hard to define what it takes to succeed in certain domains (Ernst, 1969; Chase & Simon, 1973). The example used by Dunning et al. (2004) is that it is easy to define a successful math performance because there are right and wrong answers. However, there is no exact formula for composing the perfect symphony or writing the perfect novel, so how does one measure which one is better?

Dunning, Perie and Story (1991) determined that people tend to take ill-defined character traits and define them to their own advantage. Therefore, a person who is skilled at math would consider math a skill more centrally related to intelligence than a person who is challenged by math. Consequently, people tend to believe that they are above average in respect of traits that are ill-defined but not in those traits that are more constrained (Dunning et al., 1989; Suls, Lemos, et al., 2002). Therefore, people tend to say that they are "more sophisticated, idealistic, and disciplined than their peers" (Dunning et al., 1989), all of which are ambiguous traits, but individuals are not likely to think they are any more "neat, athletic, and punctual" as these traits are more constrained in their meaning (Dunning et al., 1989). Hayes and Dunning (1997) found that college students rated themselves more highly than their roommates on ill-defined positive traits but as soon as those traits were well-defined the ratings began to agree with those of others (Hayes & Dunning, 1997; Story, 2003).

Given the fact that people prefer to find out how they are doing in comparison to others, it is noted that both Dunning, Johnson, Ehrlinger and Kruger (2003) and Weinstein (1982) found that people's comparative judgements involved very little comparisons. Dunning et al. (2004) found that when people evaluate their skills relative to their peers (with respect to the same skills) they were egocentric and thought primarily of their own skills and attributes while ignoring those of others. Kruger and Dunning (1999) found that in asking a person to evaluate their skills relative to other people in a task that they could perform well (riding a bicycle for example) people say that they are better than average, forgetting that most other people can also ride a bicycle. When asked how they thought they compared to others in the skill of juggling most people thought that they were worse than average, once again, forgetting that most people cannot juggle and showing that we do not take into consideration the skill of our peers.

These egocentric tendencies carry important implications for the base from which we prefer to compete with others. Windschitl, Kruger and Simms (2003) as well as Moore and Kim (2003) found that people would rather compete in areas that they are good at, forgetting that the people they are competing against are most likely good in the same area. College students preferred to take general knowledge

quizzes against their peers about movies involving Adam Sandler, an area they knew well, rather than in French painting, a difficult area, forgetting that what was easy or difficult for them was equally as easy or difficult for their competitors (Windschitl et al., 2003). This behaviour is irrational as performance should be relative to others rather than how good you think you are in isolation (Windschitl et al., 2003).

This kind of egocentrism manifests itself in two areas: the first being the area of controllable traits, those traits that an individual has the ability to control either through practice or decisions (Windschitl et al., 2003). Alicke, Vredenburg and Hiatt (2001) and Alicke (1985) found that people think of themselves as being superior in traits that they think are controllable but not in the area of non-controllable traits. Therefore, people think that they are more self-disciplined and co-operative than their peers (controllable traits) but that they are less superior when looking at creativity or other 'uncontrollable' traits. The second area is that of private traits and behaviours (Alicke et al., 2001; Alicke 1985) which is when a trait manifests itself internally, such as self-consciousness or being picky. When traits are private we believe that we possess these traits in excess of our peers (Alicke et al., 2001; Alicke, 1985). The opposite of this belief is, however, not true. We tend to believe that we are less aggressive, verbose or poised than others as these are negative traits that manifest themselves internally (Miller & McFarland, 1987). This tendency to "neglect the internal lives of others" (Dunning et al., 2004) can result in a phenomenon known as pluralistic ignorance which is where people believe that they possess an opinion that is unique because of the fact that individuals believe that they possess more positive and less negative traits than others. In actual fact, however, most people in their community will share the same opinion (Dunning et al., 2004).

In a study by Cooper, Woo, and Dunkelberg (1988) it was found that 81% of new business owners thought that they had a 70% chance or better of succeeding but only 39% of those owners thought that a business similar to theirs would succeed. This shows that that while people think that they are better than average, they also overestimate the likelihood of their own success.

In summary, the literature shows that individuals not only believe that they are better than the average person, they also believe that they have more desirable personality traits and are more controlled and likeable than others. They tend to ignore the fact that most people struggle with the same problems and have the same vices, thereby misjudging how well or badly they will do.

Information Deficits, Lack of Feedback and Socialisation

There is literature that points out that certain people are inhibited by the double curse of incompetence: this happens when people do not possess the information or skills to make the correct decision in the first

place, and as a result of this are unable to realise just how poor their decision was (Dunning et al., 2004). In many intellectual domains, the skills that are required to make good decisions are often the same skills that are required to recognise good decisions, therefore lacking that skill will lead to double incompetence. In a study done by Kruger and Dunning (1999) it was shown that incompetent students, i.e. those performing badly relative to their peers, fail to recognize the deficiency of their performance. Additionally, in a study by Dunning et al. (2003) the bottom 25% performers in a college exam walked out thinking that they had outperformed their peers. If investors do not have the skills to make good investment decisions then it could result in them not knowing that they are making poor investment decisions. This could lead to a large gap between their actual returns and their self-assessment of what they think their return is. A quote from Pope and Butt (1969) sums this up well: "a little knowledge is a dangerous thing".

When individuals do not possess the knowledge to make decisions they fall prey to unknown errors of omission. This happens because anyone critiquing their own work will by default be unable to do so accurately as they do not possess the skills necessary to critique their work properly (Dunning et al., 2004). Furthermore, people receive incomplete feedback regarding their work and skills and this leads them to have artificially inflated views about the wisdom and accuracy of their actions (Dunning et al., 2004).

Research into different domains has found that the correlation between performance and self-assessment of performance were stronger amongst certain groups of people. Dunning et al. (2004) found that in athletics where the feedback "tends to be constant, immediate, and objective" the correlation of objective feedback to self-perception of knowledge and objective performance was 0.47 compared to the average of the study at 0.29. Hansford and Hattie (1982) found that the correlation between people's views of their intelligence and their performance on an academic and intelligence test was between 0.2 and 0.3. Chemers, Hu and Garcia (2001) found that the correlation between students' ratings of their first year academic performance and the evaluation that their instructors gave them was 0.35. DePaulo et al. (2003) found that people's ability to detect when others were lying correlated 0.4 with when they were actually lying. When it comes to complex social skills where feedback is irregular, the correlation can be even worse. Dunning et al. (2004) found a correlation of only 0.04 between managers' perception of their competence and objective feedback. These findings in literature show that immediate and objective feedback has a positive correlation to self-perception and self-evaluation whilst more complex, social skills are more difficult to evaluate than other skills.

Individuals may find it difficult to determine how well they are performing in a more complicated environment where performance standards and the corporate environment are shifting, making it difficult to determine what good performance looks like (Ashford et al. 1989). Furthermore, individuals may also not want feedback. Feedback provides an opportunity for an individual to improve, but at the same time, could also negatively affect their self-esteem if they find that they are not performing in line with what is expected. Additionally, Ashford et al. (1989) points out that individuals might appear to be needy or insecure when asking for feedback.

Feedback is an important mechanism to help individuals obtain a better understanding of themselves and their abilities (Kluger & Denisi, 1996). However, several problems could be encountered when providing employees with feedback. Firstly, feedback is often infrequent and given too late (Ashford et al., 1989). When there are large time delays between feedback sessions, the feedback given tends to carry more weight and extra importance. This then exacerbates further problems which are discussed below. Additionally, with a long lapse in time between events and their related feedback, the feedback loses its effectiveness as individuals performed the tasks a long time ago (Larson, 1989). Because people tend to be overconfident about their abilities, feedback is often found to be threatening. If individuals perceive feedback as negative they are less likely to react to it in the correct manner (Kluger & Denisi, 1996). Feedback will often be interpreted as 'I have been a bad manager and I will thus lose my bonus this year,' as opposed to 'they are trying to help me produce more products per week' (DeNisi & Kluger, 2000; Kluger & Denisi, 1996).

Socialisation is another factor that affects individual's stock choices and trading decisions. Baker and Nofsinge (2002) concluded that socialisation among investors magnifies certain behavioural biases, notably overconfidence and the familiarity effect, where investors will invest in stocks that they are familiar with or know about. Research (Difonzo et al., 1998; Hirshleifer, 2001; Campbell & Shiller, 2001; Asch, 1956) has indicated that there are certain "herding" mentalities amongst investors that make them ignore their own private signals and rather listen to what others in the market are doing. This is believed to be one of the reasons for co-movement, where there is a movement in all stock prices even if there are no common factors, owing to a change in investor sentiment in a market. One such example was the massive internet stock bubble effect in the late nineties where all information technology stocks where vastly overpriced owing to investor sentiment surrounding the industry. As soon as this sentiment changed, stock prices crashed. Difonzo et al. (1998) showed that trading rumours, even those from non-credible sources, affect trading decisions. Langevoort (2001) believes that, because of this herding

mentality, social interaction among investors is an underexploited aspect of investing and further research into this phenomenon could be done.

While knowledge and skills are an important aspect of performing any task, those individuals that do not have the ability to perform the task competently in the first place are put in an even more difficult place as their lack of skills also means that they don't ever realise how poorly they are performing the task either. Feedback is one solution to this problem but this mechanism has its own biases and pitfalls, as individuals struggle to take feedback positively or use the full benefit that feedback can provide to developing their own performance. Individuals are prone to believing those people that they socialise with more than their own information and this leads individuals to make poor decisions, including investment decisions. Not only are individuals making poor investment decisions because of this socialisation effect, they also struggle to estimate returns accurately which will be discussed below.

Estimating Returns

Investors that are prone to behavioural biases generally make poor decisions about fund style and expenses, trade frequently and have poor performance (Bailey et al. 2011; Barber & Odean 2001; Gervais & Odean 2001). Two major research areas of behavioural biases are the disposition effect and narrow framing (Bailey et al. 2011). Bailey et al. (2011) defines the disposition effect as "the propensity of an investor to sell winners too early and hold losers too long." Bailey et al. (2011) along with other research (Shefrin & Statman 1984; Odean 1997) found that investors sell a greater proportion of winners and a relatively smaller proportion of losers . Narrow framing is the propensity of an investor to select investments individually, instead of considering the broad impact on their portfolio and thus not being aware of the effect on overall portfolio performance (Bailey et al., 2011).

Bailey et al. (2011) found that there were positive correlations between the disposition effect, narrow framing, and in particular; lottery stocks preference, a preference for risky stocks. This shows an investor with substantial behavioural biases and in particular: a taste for risky stocks. Bailey et al. (2011) termed this type of investor as the Gambler. This type of investor also had negative correlations on age, income, investment experience and portfolio size which suggests that "the Gambler is relatively young, poor, unsophisticated, and inexperienced". The negative correlation on stock portfolio diversification for this investor indicates a tendency for the Gambler to dive into single stocks rather than to spread their risk or invest in mutual funds.

Saunders (1993) investigated the NYSE returns and found that the exchange tends to earn positive returns on sunny days and mediocre returns on cloudy days. Goetzmann and Zhu (2002) are of the opinion that this is not because of individual investors trading patterns, but rather the mood of market makers. Kamstra, Kramer and Levi (2000) found that the outcome of major sport events' as well as changes to daylight savings further affected the mood of market makers. These findings show that emotions can play a large part in investor decisions. Furthermore, if these emotions are affected by external sources, the estimate of returns by investors could be biased resulting in incorrect assessments.

In a study by Amromin and Sharpe (2005) it was shown that the average investor believes the stock market will have persistent returns from year to year. From this, it was concluded that past returns could be extrapolated over the medium and long term to infer expected returns. This implies that, for the ordinary investor, when they expect the economy to be strong, the expected return relative to the amount of risk that is being taken on will be better than when the market is weak (Amromin & Sharpe 2005). Expected returns over the shorter term are more volatile than over the long term (Amromin & Sharpe 2005) which means that current market behaviour will affect estimates of past returns more in the short term than in the long term (Amromin & Sharpe, 2005; Ben-David et al., 2007). An interpretation of this finding is that expected returns vary with the business cycle (Amromin & Sharpe, 2005). When the economy is in a recession, returns are thought to be higher, and when times are good, the returns are thought to be lower (Amromin & Sharpe, 2005).

Education, wealth, and other general financial market knowledge were the three factors that helped to increase an investors accuracy of the estimate of their past returns (Amromin & Sharpe, 2005). Therefore, as the respondent's education level or the dollar value of their stock holdings increased, they had a much smaller recall error. However, when they controlled for age, Amromin and Sharpe (2005) found that the accuracy of their predicted returns were not significantly influenced by the number of years of investment experience.

Fischhoff et al. (1977) believe that one aspect of risk is being unfamiliar with the stock that you are investing in, which results in a local and familiarity bias. Familiarity bias is the bias of an investor to invest in stock that they know of i.e. a stock that they are familiar with and whose operations they deal with often while a local bias is the reluctance to invest in anything that is not from the same region or country. These two biases are one of the reasons why investors are reluctant to diversify internationally despite the diversification advantages that this can hold. Coval and Moskowitz (1999) showed that this is largely due to local investors having an information advantage over their international counterparts. In a study

by Guiso, Sapienza and Zingales (2008) respondents believed that the stock of their employer was safer than that of a diversified portfolio. Therefore, the evidence suggests that people view stocks that they are familiar with more favourably and believe that these stocks will deliver higher returns with a lower level of risk. Familiarity will shift portfolio weights towards local and familiar stocks, affecting the investors perceived risk and related return (Huberman, 2001).

Individuals have been found to significantly overestimate historical returns (Kaustia et al., 2008). Goetzmann and Peles (1995) found that individual investors tend to overestimate the performance of their mutual funds by several percentage points and Kaustia et al., (2008) found that this was also true for general market returns.

While estimating returns is not easy for a rational investor, it is made even more difficult by the biases that affect an individual's decisions. Furthermore, an investors perceived opinion that they are better than others and more likely to succeed encourages them to trade more, often thinking that it will lead to better returns.

Experienced Investors

Feng and Seasholes (2005) define experience as the evolving behaviour of a single investor with regards to their investing decisions while Wilde (1900) stated that experience is the name we give to our mistakes. Feng and Seasholes (2005) determine experience by looking at the number of stock positions an investor has taken up until a particular date. Feng and Seasholes (2005) point out that experience, along with sophistication, minimise the disposition effect.

Sophistication is defined as the number of "rights" i.e. ways that an investor is permitted to trade on their account, such as by use of the internet, telephone etc. Feng and Seasholes (2005) propose that more sophisticated investors are generally inclined to use more methods to trade. They apply for, and are generally granted, more rights at the time they open their accounts and are thus a more 'sophisticated' trader. Furthermore, Feng and Seasholes (2005) determine sophistication by the diversification level of a portfolio on its inception as well as the age of the investor.

Grinblatt and Keloharju (2001) performed a comprehensive study of investment behaviour and showed strong evidence of the disposition effect among all major types of investors' i.e. non-financial corporations, financial and insurance institutions, governmental organizations, non-profit institutions and households. This shows the presence of behavioural biases in all aspects of the financial markets.

By looking at different investment groups, i.e. retail investors vs. professional money investors, researchers have been trying to determine if there is evidence to support the disposition effect (Shefrin & Statman, 1984; Odean, 1998; Shapira & Venezia, 2001; Locke & Mann, 2005; Locke & Onayev, 2005; Feng & Seasholes, 2005). Feng and Seasholes (2005) found that sophisticated investors are 67% less likely than the average investor in their sample to exhibit symptoms of the disposition effect. Trading experience as a single factor can reduce the disposition effect in an individual by 72%, while a combination of trading experience and sophistication eliminates the reluctance in an investor to realise losses (Feng & Seasholes, 2005). On the other hand, Feng and Seasholes (2005) found that there is a large asymmetry between experience/sophistication and the disposition effect. Feng and Seasholes (2005) found that no amount of experience/sophistication could eliminate an investors propensity to realise gains. By looking at the effect that experience can have on this behavioural bias, it can be expected that as investors become more experienced, they are less prone to biased behaviour. As they are less prone to these biases, including overconfidence, experienced investors might be better placed to estimate their own returns more accurately.

List (2003) investigated whether market experience eliminated the endowment effect: which implies that a good's value increases once it becomes part of an individual's endowment. List (2003) performed a study where the subject was endowed with good A and they had the option to trade it for good B. In a different treatment, a second subject is endowed with good B and they have the option to trade it with good A. As the subjects have been allocated to one of the two goods randomly, List (2003) hypothesises that "fewer than 50 percent of the subjects should swap their good if an endowment effect exists." Or viewed slightly differently, if roughly 50 percent of the subjects do trade then this will indicate the non-existence of the endowment effect. List (2003) determined that the endowment effect was present and thus went on to test if experience eliminated this effect.

List (2003) then obtained data from sports memorabilia auctions, specifically sports cards and collectable pins, which is a field where dealers gain experience from seeing different types of cards and pins with varying levels of rarity and quality. List (2003) looked at dealers, who have market experience and non-dealers, who are predominantly inexperienced, to determine if there is a relationship between experience and the endowment effect. By giving participants one of two rare baseball cards of equal value, List (2003) proceeded to pull the other card out from under the table and ask the participant if they wanted to swop their card. After studying the results of the test List (2003) found that there was an endowment effect in the pooled data of the study which is consistent with other literature by Knetsch (1989), Kahneman et al.

(1990) and Bateman, Munro, Rhodes, Starmer and Sugden (1997). List (2003) also found evidence that suggested that market experience matters across all consumer types. List (2003) determined that there is an inverse relationship between market experience and the endowment effect. List (2003) then looked at those traders with a lot of trading experience, dealers and experienced non-traders, and determined that with this level of experience the endowment effect becomes negligible. List (2003) then returned to the same auction a year later and examined the same subjects and found that "market experience significantly attenuates the endowment effect." List (2003) also found a link between gender and the endowment effect as women were found to trade less but stated that: "although gender and the endowment effect appear linked, future research is necessary before any firm conclusions can be reached concerning this relationship." Feng and Seasholes (2005) comment that in comparison to the study done by List (2003), experience would not help to determine if one share certificate was more valuable than another share certificate of the same company as it would with baseball cards. Rather, experience should help an investor to resist the urges that could prompt them to make trades that lose money.

In studies done by Kahneman et al. (1990), Kahneman et al. (1991) and Knetsch (1989) there is strong evidence in favour of the endowment effect. In Knetsch's (1989) study, 89 percent of those subjects originally endowed with a mug chose to keep the mug. Of the subject that were given a chocolate bar; 90 percent of those subjects decided to keep the chocolate. The results from Kahneman et al. (1990) were as clear as Knetsch's (1989) study. Subjects were given Cornell University coffee mugs and allowed to trade them. If there was no endowment effect it was expected that 11 subjects would perform trades, however, over the four repetitions that were run only three trades were observed. This evidence further proves the existence of behavioural biases in subjects' decision making.

Feng and Seasholes (2005) showed that experience curves of both young and old investors as well as both genders are upward sloping for different types of traders, thus not confined to a specific market or type of trader. Furthermore, these upward sloping curves were noted for both high and low frequency investors. List (2003) found strong evidence that as an individual becomes more experienced, their behaviour converges towards an unbiased prediction. Because of this, it would be expected that as an investor becomes more experienced in the field of trading that there would be less bias in their decisions. Furthermore, this would imply that they would be able to more accurately predict what past returns have been as well as being able to display more realistic expectations of future returns.

Greenwood and Nagel (2009) found that age is a reasonable proxy for experience. Vissing-Jorgensen and Attanasio (2003) show that young, inexperienced investors had the highest stock market return

expectations in the late 1990's whilst Greenwood and Nagel (2009) found that inexperienced money managers (albeit having gone through training) displayed more significantly affected trading behaviour compared to experienced managers.

A study by Smith, Suchanek and Williams (1988) showed that inexperienced traders have adaptive expectations and Lahav, Noussair and Haruvy (2007) showed that investors extrapolate recent price movements when forming expectations. In validation of other research results (Feng & Seasholes, 2005; Kaustia & Knupfer, 2008; Malmendier & Nagel, 2011; Seru, Shumway, & Stoffman, 2009), Greenwood and Nagel's (2009) research indicates that prior experience influences investor behaviour.

Seru et al. (2009) point out that there are two ways in which investors can gain experience; the first is learning through doing (Arrow, 1962; Grossman et al., 1977) and the second is to learn about their skills. Although these are the two main areas of learning they are not mutually exclusive and thus the importance of one cannot be looked at without taking the effect of the other into account (Seru et al., 2010). As investors begin trading they discover that there is a large amount of information available to them and are unable to discern which is important and which is irrelevant (Seru et al., 2010). However, as they begin trading more and doing more research, they learn which of their sources they should place more reliance on. When an investor discovers that he or she has no reliable source of information or that they are unskilled in investing they will stop trading completely and chose rather to invest in a passive investment such as an index (Seru et al., 2010). Seru et al. (2009) found that 1 years' worth of experience in the market is the same as an investor performing 100 trades. This could lead some investors to believe that excessive trading and incurring those initial trading costs is beneficial in the long run as they will be gaining valuable experience (Seru et al., 2010).

Over a 30 day investment period Seru et al. (2009) found that an investor with one year of experience would earn 22 basis points more than an inexperienced counterpart. Additionally, Seru et al. (2009) found that as investors became more experienced, they increased their returns. This is achieved through experience or through realising that as an investor they are ill-equipped and would be better off investing in an index fund (Seru et al., 2010).

Bailey et al. (2011) looked at behavioural biases to determine how they jointly relate to each other and measured their respective correlations. The major findings were that investors who timed their trades badly typically made decisions in isolation, bought speculative stock and ignored firm-specific information. All of the investors who timed trades badly also had the characteristics typical of an investor prone to the

disposition effect and narrow framing. These investors also exhibited a preference for buying lottery stocks (those with high risk and little chance of success) as well as being inattentive to earnings news from companies. Bailey et al. (2011) further found that age is positively correlated to investment experience and stock portfolio size. Investors who use short selling of shares or options are more likely to be experienced as well as financially sophisticated. These investors also have a greater diversification in their stock portfolios and minimise their tax through smart structuring of investments (Bailey et al., 2011). There were certain non-correlations that were discovered, such as: no association between investment experience and stock portfolio performance, i.e. the more experienced investors did not outperform their inexperienced counter parts, and there was also a negative correlation between stock portfolio diversification and stock portfolio performance (Bailey et al., 2011). It can thus be inferred that although experience has positive effects on certain behavioural biases, there are some behavioural biases for which experience is not the cure.

The majority of the literature shows that experience will aid an investor in their decision-making as well as their ability to consider all necessary information. Owing to this it would be expected that the more experienced an investor is, the more accurate they will be in estimating past returns.

Gender

Gender differentials in investment behaviour have been researched by various authors (American, May, & Correl, 2001; Barber & Odean, 2001; Lichtenstein & Fischhoff, 1981; Read & van Leeuwen, 1998). This research will draw on these research areas to determine if there is any difference in the accuracy with which men and women estimate past returns.

Psychological research shows that men are more overconfident than women (Lundeberg et al., 1994), especially within the realm of finances (Prince, 1993). Deaux and Farris (1977) stated that men claim better overall ability than women do, but that this overconfidence is most prevalent in areas that are traditional masculine tasks. Deaux and Farris (1977) further prove that owing to the fact that overconfidence leads to over-trading, men are inclined to trade more than women. With the prevalence of share trading costs, men have subsequently been found to earn lower returns (Barber & Odean, 2001). Deaux (1977), Meehan and Overton (1986) and Beyer (1990) all found that in studies between genders; the effect of the self-attribution bias was greater for men than it was for women. It was concluded that men were thus more likely to become overconfident than women were.

Barber and Odean (2001) and Lewellen, Lease and Schlarbaum (1977) analysed survey responses and brokerage reports to determine if there was any evidence of overconfidence among investors. Both Barber and Odean (2001) and Lewellen et al. (1977) found that men spend more time and money on analysing securities, rely less on the information and advice from their brokers, make more transactions, believe that stock returns are more predictable and anticipate higher returns than women do. In all these aspects, men were found to exhibit more overconfident characteristics than their female counterparts did. Barber and Odean (2001) found that both men and women expect to outperform the market with their own portfolio, this overconfidence was more extensive among men than their female counterparts. In addition to this, it was found that men held riskier positions in their common stock portfolios in comparison to women. This could ultimately result in a higher variability in returns earned by men (Barber & Odean, 2001).

Correl (2001) performed research into the different types of jobs that men and women hold and determined that there was a significant difference between the genders ((Reskin, 1993; Jacobs, 1996; Jacobsen, 1994). Correl (2001) examined how gender differences in the perception of mathematical ability between college students influenced their career choices into mathematics, engineering and physical sciences. Correl (2001) found that as individuals move further and further down their study path, there are fewer females who choose quantitative career paths, in comparison with their male counterparts. This implies that fields such as law, medicine and engineering are more male-dominated. Catsambis (1995) and McIlwee and Robinson (1992) also found that the ratio of females to males declines as young people progress down the career path toward quantitative professions. Thus, only the most skilled and talented females will progress down these career paths and there could thus be a natural selection bias evident when analysing results from competency tests. Furthermore, those women who are confident enough to invest on their own behalf could have more knowledge and skill than their male counterparts owing to this natural selection. We could thus expect to see more accurate estimates of their past returns as they are more experienced.

Conclusion

There is a wealth of evidence strongly indicating that people make substantial errors when they evaluate their “abilities, attributes, and future behaviour” (Dunning et al., 2004). When people produce these incorrect self-assessments, there are several psychological mechanisms which can broadly be classified into two classes; those resulting from a lack of necessary information, and those where relevant and useful information at hand is ignored. Both result in an inaccurate assessment of the situation. In the first group,

individuals cannot take into account what they do not know and cannot accurately assess themselves (as they are unaware of how much they do not know). The second group is where all relevant information is available, but it is not used as a rational person should use it, resulting in an incomplete picture (Dunning et al., 2004).

"People are often motivated to reach flattering conclusions about themselves and their place in the world" (Dunning et al., 2004). They will mould, manipulate, massage and manage all the feedback that they receive to make themselves feel like capable and loving people. Literature is full of examples of how these manipulations are done and examples of how individuals will try and construe as positive an image as possible while ignoring all negative aspects (Baumeister & Newman, 1994; Dunning et al., 2003; Kunda, 1990).

For people to develop a better, less biased, picture of themselves they need to be aware of the biases at play as well as receiving feedback that is more accurate and timely. This feedback will help them to be more realistic about their own abilities and hence the returns that they estimate that they have had. Additionally, knowing that people are generally overconfident should convince people to have a 'safety mechanism' when estimating their own abilities and maybe reduce their self-view by a certain factor which will counteract the normal human nature (Heath et al., 1998).

After reviewing behavioural biases that affect individuals it is apparent that there is no such thing as a rational investor and one could be expected to find the same irrationality in how investors estimate their returns. Overconfidence has a major effect on all individuals, but more so in men than in women. Furthermore, other major biases and heuristics, such as anchoring, representativeness and conservatism have been shown to affect investor behaviour and decisions. However, not only are individuals prone to these errors, but the less experienced they are, the more prone they are to these biases. With experience comes the ability to better read and understand one's own ability and take feedback in a better light, which enables them to perform better. It was further noted that the more regular feedback is, the better an individual will respond thereto and hence, the more effective the feedback will be. Individuals also prefer to be compared to others rather than to objective standards as they are more prone to acting when they are compared to peers. At the same time though, when an individual thinks about the likelihood of success or being better than their peers, this comparison is forgotten as they only think about success and not success relative to their peers. Lastly, whilst important information is often available when making decisions and comparisons, individuals tend to ignore this information thinking that they are in fact better than the average individual.

Methodology

Research Questions

The literature has shown that individuals overestimate their returns and are overconfident. They are also prone to anchoring their decisions and fall prey to the representativeness bias, among others. In light of these findings; the following research questions were proposed:

1. Do investors overestimate their returns?
2. Does experience (with age as a proxy) influence the degree of overestimations?
3. Are investors estimations influenced by anchors?

In order to test these research questions null hypotheses have to be tested to determine if there is statistical evidence to support what literature has shown in other settings. The statistical significance level will be set at 95% as advised by the Statistical Sciences Department at the University of Cape Town. If the null hypothesis is accepted it will show that there is no difference between the actual and estimated returns earned by investors, that experience has no effect on the degree of overestimation and that estimates are not influenced by anchors. The implication if the null hypotheses are rejected, are that investors overestimate their returns, experience affects the degree of this overestimation and that estimations are affected by anchors.

The focus of this study is thus to look at investors estimates of past returns and in particular their estimates of equity returns. The reason for only including equity funds will be explained in the research approach

Research Approach

This research is an attempt to replicate a study performed by Glaser and Weber (2007). Glaser and Weber (2007) obtained data from a German online broker for investors who had opened their accounts prior to 1997 and had traded at least once during 1997. The data that Glaser and Weber (2007) analysed ranged from 1997 to 2001. Data available from the online broker included the investors age, gender, investment strategy and investment experience. Glaser and Weber (2007) then sent out an online questionnaire asking those investors what they thought the return on their portfolio had been over the specified time period.

Glaser and Weber (2007) calculated the return of each investor by looking at all the trades that had taken place on their accounts, and assumed that all trades took place at the end of the month. The results from the survey showed that the average estimate of returns was 15% per year and there was a range of

answers from -50% to +120%. The calculated correlation coefficient between estimated and actual returns was found to be -0.0471 with a p-value of 0.5203. Glaser and Weber (2007) found that this lack of correlation was consistent with a study performed by Owhoso and Weickgenannt (2007) and showed that there was no statistical relationship between estimates and actual returns. Glaser and Weber (2007) found that the relationship between actual and estimated returns was positive where estimated returns were statistically significantly higher than the realised returns. Glaser and Weber (2007) also found that experienced investors were better able to estimate their past returns and showed that investors with more than five years of trading experience were much better able to estimate their past returns than those with less than five years' experience. The focus of this study is thus to look at investors estimates of past returns and in particular their estimates of equity returns. Age will be used as a proxy for experience as was documented by Greenwood and Nagel (2009) and Seru et al (2009). The results of the survey will also be analysed to determine if there is any evidence of anchoring, as was found to be the case by Kahneman and Tversky (1982) and Barberis and Thaler (2003).

For this study, only pure equity funds will be looked at, as this is the closest replication that could be made of Glaser and Weber (2007) who performed analysis on equity market data. The choice of funds was thus restricted to those funds classified as equity only per the PSG data obtained. PSG is an investment holding company that owns investments in many different industries including financial services, banking and private equity. PSG issue financial data on a daily basis and it was this data on unit trusts that was used to determine the funds to analyse. A sample of the funds selected from the PSG listings were tested against the data provided by the unit trust houses themselves for reliability and all those tested were found to be accurate. Furthermore, to take out any noise relating to foreign currency and foreign equity markets, any globally traded funds (funds with foreign equity holdings) were excluded from the sample to create scope for consistency in the analysis of returns and to be able to provide a relevant anchor (the JSE All Share Index) to respondents. The Pareto Principle (Sanders, 1992), which infers that 80% of the wealth could sit with 20% of the investors, was then applied to the unit trusts. The funds that comprised 80% of the total assets under management were determined by finding the smallest number of funds that comprise the required 80% of the wealth. The funds were ranked in size order, according to the closing value of funds under management on the 30th of June 2013. These funds were then ranked in size order, from most funds under management to least. By summing together the total value of all the funds it was determined that the 13 biggest funds represented slightly more than 80% of the total funds and these funds were thus selected to be included in the questionnaire. For completeness, an 'other' row was inserted where

participants could list the name of a South African equity fund that was not one of the 13 listed funds provided. However, these funds were not analysed.

Research Strategy

Glaser and Weber (2007) sent out an online survey to obtain investors estimates of their past returns, thus in replicating this study an online survey was sent out whereby estimates of past returns, along with other information, were obtained. The University of Cape Town offers an online research tool called Qualtrics which was used to carry out the survey. Qualtrics is used in research surveys worldwide and has been approved by the University's Commerce Faculty. The initial page of the survey explained to the respondent what the purpose of the survey was and asked if they wished to partake. Only if they clicked 'yes' were they able to proceed to the next page of the survey where they were asked for certain demographic information (Appendix 1). Not all of the demographic information was used for testing purposes in this study, however, it was included to make the survey more thorough and complete. Respondents were asked for their rating of their own investment knowledge, their highest qualification and which faculty/industry they work in. Age was used as a proxy for investing experience to determine if experience diminishes the prevalence of the behavioural biases under investigation as was used by Greenwood and Nagel (2009) and Seru et al (2009). Respondents were also asked if they directly invest (i.e. not via a pension fund, retirement fund or provident fund) in a unit trust as being indirectly invested was seen as not being in charge of money allocations and thus not of relevance to this study.

If the participant does invest in a unit trust he/she was asked if it is an equity only unit trust that they are directly invested in. If this is the case then a list of unit trusts would appear (as determined using the Pareto Principle explained in the research approach) with space to add up to three additional equity only unit trusts.

Respondents were then asked to fill in the year that they started investing in each unit trust selected. This was done in order to determine over which periods returns could be garnered for each respondent, which later helped to analyse if their estimates of returns were applicable or not. As an example, if a respondent stated that they started investing 4 years ago but had estimates for five and ten year periods then these estimates would not be valid and excluded from analysis.

Respondents were asked to estimate what annualised return they thought they have earned over the preceding 12 months, 3 years, 5 years and 10 years for the period ending 30th of June, where applicable, for each fund selected. Respondents were then presented with the Johannesburg Stock Exchange (JSE) All

Share Index returns (J203) for the preceding 12 months, 3 years, 5 years and 10 years for the same period ending 30th of June and asked, bearing the JSE returns in mind, to re-estimate the returns that they thought they had earned on their unit trusts over the same periods. The purpose of this was to test if anchoring was present and if so, to what extent the respondents would adjust their initial estimates when presented with the anchor. The JSE All Share return was selected as the anchor as it was the benchmark for most of the funds included in the analysis.

The estimated returns for each fund were benchmarked against the annualised returns obtained from Bloomberg. Bloomberg is a New York based financial and news service founded in 1981. They are also used by UCT libraries as an approved data provider. The estimated returns were benchmarked for each applicable period to determine if there were any statistically significant results. The annualised returns given by Bloomberg were tested against fund fact sheets, obtained from each investment house's website, to corroborate the results given to those presented by the funds. The fund fact sheets are the reported results presented by each fund, either quarterly or monthly, stating the biggest asset allocations and how the fund has performed compared to the fund benchmark (for the funds selected, the majority were benchmarked against the JSE All Share Index). One anomaly was noted, relating to the returns quoted by Investec. The fund fact sheets for the Investec Value Fund reported positive returns over the preceding 12 months to 30th June but the Bloomberg data indicated a loss of 4.17%. It was decided to exclude this fund from the analysis due to this discrepancy. However, the fund was left in the questionnaire for completeness sake.

The survey was cognitively tested by 10 people to evaluate the wording of the survey, its design and to help ensure the completeness of responses received from participants (Presser et al., 2004; Willimack et al., 2004). Of the people cognitively tested there were five males and five females and these individuals were spread across different faculties within the University of Cape Town as well as different jobs i.e. not employed by the University of Cape Town, and were of different ages. The suggestions from this testing were then analysed and, where appropriate, changes were made to update the original questionnaire. The updated survey can be found in Appendix 1. The changes made to the original survey were as follows:

1. Changing the age from a manual input to a drop down list.
2. The wording of certain questions were misinterpreted as the questions were either too long or not in bold/underlined and these questions were reworded and/or re-emphasised to draw attention to the important aspects.

3. The statement asking not to look at a fund fact sheet was removed from the question and made the subject of its own question to highlight this request to a greater extent.
4. An explanation of what 'equity' is was inserted to remove any ambiguity or misunderstanding.
5. Further demographic information was inserted asking about race, home language and marital status to improve potential qualitative assessment.
6. An additional question was inserted asking if the participant has any children with the next question asking how old they are.
7. The question asking for their children's age was changed to state that the age should be in years.
8. Options were added to reduce the variability of responses as to why participants were not directly invested in a unit trust in general or in an equity only unit trust, to ease the analysis of results. A multiple selection was made available with some of the common reasons given through the cognitive tests. An 'other' text box was also inserted to allow participants to fill in any other reason that they had for not investing in unit trusts in general or equity only unit trusts.
9. Two additional questions were inserted with drop down lists for participants to select which faculty they work in and what their job position was.
10. A clarification was made as to why an explanation was provided showing the difference between cumulative and annualised returns to avoid ambiguity.

Research Method

Owing to the low expected response rate, as indicated by the consultation services offered by the Statistics Department at the University of Cape Town, incremental sampling was used to obtain as many responses to the survey as possible, to improve the robustness of the results. The first sample were staff members, both academic and PASS (support) staff, at the University of Cape Town. The survey was sent out to 1 168 staff members at the University of Cape Town. The next sample included other Universities in the Western Cape, and thus the University of Stellenbosch, Cape Peninsula University of Technology and the University of the Western Cape were contacted. Only the University of Stellenbosch responded and granted permission for the survey to be sent. The last step of the incremental sampling process was to include other universities in South Africa. From those contacted, the University of the North West (NWU) and the Nelson Mandela Metropolitan University (NMMU) agreed to partake in the study. No response was received from WITS University, the University of KwaZulu-Natal (UKZN), Rhodes University, and the University of the Free State. The University of Johannesburg (UJ) denied access to their staff members and they thus did not form part of the sample. In total, over 6 000 participants were contacted

at the participating universities to request taking the survey. The total number of participants that completed the survey was 466.

Of the 466 participant's responses that were gathered, 81 participants stated that they were directly invested in equity only unit trusts. These responses were tabulated and reorganised to make comparison and statistical analysis easier. Certain respondents were invested in more than one unit trust and were invested for different periods of time. Thus some investors returned one data point (i.e. only gave one estimate and no adjusted estimates) while other investors were invested in five unit trusts and could supply up to forty data points (four estimates for all five unit trusts, 20 estimates, and an additional 4 adjusted estimates for those unit trusts, another 20 estimates). In total there were 407 data points supplied by the 41 participants, (81 respondents less 40 that were excluded, explained below), that were analysed. In order to allow for testing of the data points which comprised a bigger sample, over the number of respondents (a smaller sample), the distribution of the data points required testing to ensure that there weren't a small number of respondents making up a large number of data points. i.e. if a small number of respondents were invested in multiple funds over multiple periods, then whichever bias' they presented, would carry a large weight on the total sample and potentially be an incorrect result. To test for this, the Pareto principle was again applied and it was found that 66% of the respondents made up 80% of the data points. Upon further visual testing, the data points appeared to be randomly distributed and it was therefore determined to be appropriate to test the data points going forward (Appendix 3).

An inspection of the data was done to determine if there were any invalid responses or outliers. Invalid responses were those responses where participants had written words or a sentence not relating to a numerical estimate, such as: "I'm not sure but bad" as their estimate of the fund's return. Such invalid responses were excluded from analysis. All the valid responses were inspected to ensure that they were in the correct format to perform statistical tests on.

Upon inspection of the estimates of fund returns, one anomaly was noted. One participant had stated estimates ranging from 110% to 300% returns over the required period. These returns were significantly higher than any other estimates and appeared to be cumulative returns (not annualised returns). Owing to the uncertainty regarding this investors estimation, this participant was excluded from any analysis.

Of the 81 participants that indicated having an investment in equity only units trusts, 39 participants did not provide any estimates for the funds that they indicated they were invested in or gave responses that could not be analysed and one investor provided cumulative returns, rather than annual returns.

Therefore, 40 investors were excluded from the 81 participants, resulting in only 41 respondents available to be analysed.

The results of the survey will also be analysed to determine if there is any evidence of anchoring, as was found to be the case by Kahneman and Tversky (1982) and Barberis and Thaler (2003), as it has been described as one of the original three decision-making heuristics (Kahneman et al., 1982). The design of the survey was such that analyses of these biases were possible.

Research Process

In order to determine if the above research questions are true or not they needed to be statistically tested. The statistical tests used were dependant on the type of data that was collected during the surveying process.

The following tests were used for each of the research questions and are discussed in more depth in the results chapter.

1. Wilcoxon sign test
2. Spearman rank correlation test
3. Wilcoxon Mann-Whitney rank sum test

Ethics

As people were involved in the research it was necessary to obtain ethical clearance from the University of Cape Town. This necessary process was followed and ethical clearance was duly given to go ahead with the research. All respondents to the survey agreed to participate in the survey as the first page of the questionnaire required all participants to agree to participate before being able to proceed. A brief synopsis of the research was presented on this first page and contact details were provided if there were any queries. Respondents were told that as participation was voluntary they could choose to withdraw from the survey at any point in time and their responses would not be recorded. The respondents were not of a vulnerable population as they were all employed and of the age of majority. There were certain demographic questions which could be deemed to be of a sensitive nature and for these questions a 'prefer not to answer' answer was provided for those respondents who felt uncomfortable with the question. Each additional university contacted required approval prior to the survey being sent to staff members. NMMU required a whole new ethics form to be completed and submitted while Stellenbosch

and NWU only required proof of the UCT approval in order to send out the survey. All ethical requests were adhered to and the appropriate clearance was obtained prior to the survey being sent out.

Limitations and Risks

A limitation to the study was the low expected response rate. This limitation would thus result in a small sample size. This risk was mitigated by approaching other universities in South Africa and not only the University of Cape Town. The total responses for the survey were 466 and of those responses, 81 were directly invested in equity only unit trusts. After removing the 40 responses, as explained in the research method above, there were a total of 41 investors and 407 data points to be analysed which was a sample size large enough for statistical analysis as determined by the University of Cape Town's Statistical Sciences Department.

Another limitation was the lack of an individualised accurate return being available for comparison for each individual investor. Due to investors withdrawing and investing money throughout the periods being surveyed there is the possibility of an individual investors' returns differing from those of the fund. This difference in returns could lead to less statistically significant variances in actual performance but it could also be the case that they lead to more statistically significant results. However, it was stated by Tippett (1994) that money weighted and time weighted returns are actually not significantly different over a 'short enough' time interval (less than 10 years) and thus the fact that the investors actual results were not the same as the funds did not matter. Additionally, Willows (2012) showed that 90% of investors invested in unit trusts over the five year period from 1 January 2007 to 31 December 2011 made no lump sum contributions, withdrawals or transfers into or out of the fund. However, Willows (2012)'s sample was drawn from a single third party investment house and the results did not take debit orders into account.

Results

The three research questions stated above were each looked at and analysed separately during testing. A broad overview of the data obtained is discussed and presented below.

The minimum estimate obtained from participants was '0' and the maximum estimate was 150%. It was noted that no investor estimated a negative return over any of the investment periods under question and the reason for this could warrant further investigation. This, however, is beyond the scope of this study. The median for the estimated and adjusted estimate fund return were also calculated and can be seen in table 1 below.

The reason for the difference between the number of estimates (407) and adjusted estimates (198) in table 1 below is that certain respondents did not indicate an adjusted return for the periods that they had provided initial returns for. Applying the Pareto principle it was determined that 80% of the adjusted estimates lay with 48.8% of the investors and it was thus determined appropriate to continue testing the population of adjusted estimates. Appendix 5 shows the distribution of the adjusted estimates supplied by respondents.

Table 1: Summary of data

Variable	N	Min	Median	Max
Estimate	**407**	**0%**	**5%**	**150%**
Actual Fund Return	**407**	**-4%**	**17%**	**58%**
Adjusted estimate of return after anchor introduced.	**198**	**0%**	**15%**	**38%**

Appendix 4 shows the composition of the 41 respondents whose data points were included in the testing performed.

1.1 Do investors overestimate their returns?

Upon analysis of the data obtained from the online survey, it was determined that the data was non-normally distributed (Appendix 4). The data collected was a distribution of investors estimates of their

fund returns. As a result of the non-normal distribution of estimates, the Wilcoxon sign test was used to test for overconfidence among investors' estimates of their returns. This Wilcoxon sign test is a non-parametric version of the paired samples t-test. In a paired samples t-test the assumption is that the data is normally distributed and so testing can be done by looking at the estimate versus the fund return using the assumption of normality. However, as the data is non-normally distributed, the t-test would not suffice and thus the Wilcoxon sign test was used to test the difference between the fund return and the investors estimate of their return. The reason that the test is a paired test is due to the fact that the estimate made by the investor is 'paired' to the actual return earned by the same fund (as calculated from the fund fact sheet), for analysis.

Both a two-sided and one-sided test was performed. The two-sided test was used to determine if there was either over or under estimation compared to the fund return. The one-sided test was then performed to determine if the significant difference, identified in the two-sided test, was an over or under estimation. Thus, where no statistically significant difference was found between the initial estimate and the fund return, no one-sided test was required to be performed.

Table 2: Testing for Overconfidence

	Wilcoxon Sign Test			
	Two Sided alternate hypothesis	**p-value**	**One-sided Null Hypothesis**	**p-value**
Estimate vs. Actual Fund Return	**1**	**<0.001**	**2**	**1.000**

1. For the two-sided test, the following hypothesis was tested:
   Ho: Median of Estimate - Fund returns = 0 vs.
   Ha: Median of Estimate - Fund returns not equal to 0

2. For the one-sided test, the following hypothesis was tested:
   Ho: median of Estimate - Fund returns ≥ 0 vs.
   Ha: median of Estimate - Fund returns < 0

The p-value of the two-sided test is significant at the 5% level, showing a difference in the medians of the estimated and the actual fund returns. The p-value of the one-sided test is not significant, indicating that investors are underestimating their fund returns rather than overestimating them, as was shown by Glaser & Weber (2007).

A possible explanation for this result might be the financial crisis of 2008 (Appendix 1) being fresh in investors minds. This might lead investors to think that the returns they have earned are less than what they have actually achieved. The reason for this result is beyond the scope of this research, but is an area for future research.

1.2 Gender Testing

Further testing the under confidence identified in the testing done in hypothesis 2 above, the respondents were split by gender to test if one gender was making statistically significantly higher or lower estimates than the other gender. A Wilcoxon-Mann-Whitney test was done on the respondents based on gender. The test is a two-sample test due to the fact that there are can only be two possible answers, i.e. male or female. A rank sum, which is the summation of all the observations for that gender, was generated and compared against the expected rank sum to determine if the sum is statistically significant. Based on the rank sums from the analysis there was a statistically significant difference and the results are presented in table 3 below:

Table 3: Gender Testing

	Wilcoxon Rank Sum Test (Mann-Whitney)			
	Observation	**Rank Sum**	**Expected**	**p-value**
Female	**14**	**26410**	**31302**	**<0.001**
Male	**27**	**62843**	**57951**	**-**
Combined	**41**	**89253**	**89253**	

Key:

- **Observation: Number of respondents**
- **Rank Sum: Sum of all data points**

- **Expected: Expected sum given split between male and female**
- **P-value: significance of difference between rank sum and expected**

The p-value is significant at the 5% level reflecting statistically significant differences between estimates made by males and females. This is reflected by the p-value of less than 0.001. Only one test is required to be run as showing a difference between females and males will return the same result if tested between males and females. The rank sum totals reflects males having higher estimates than females. This is in agreement with Bengtsson et al. (2005); Bhandari and Deaves (2006); Estes and Hossseini (2001); Furnham (2001); Gysler et al. (2002); Jones and Tullous (2002); Powell and Ansic (1997); Rammstedt and Rammsayer (2002) and Subrahmanyam (2008) who all noted overconfidence among male investors. However, as the sample as a whole was underestimating their return; the finding that males had higher estimates than females might indicate that they were estimating their past returns more accurately. This could be due to the fact that women have stronger negative recall bias (Beyer, 1998), resulting in female's estimates being more heavily affected by the negative perception of the financial crisis of 2008 than their male counterparts.

2. Does experience (with age as a proxy) influence the degree of overestimations?

Despite the results of the first research question showing an underestimation by investors, it would still be useful in determining whether experience (with age as a proxy (Greenwood and Nagel, 2009)) perhaps minimises this underestimation or worsens it.

A Spearman's rank correlation test was performed by ranking the age of investors and correlating them against their estimated returns to determine if there was any relationship. A p-value of <0.001 was determined (Table 4 below) from the tests performed.

Table 4: Age Testing

Spearman Rank Age Correlation Test	
p-value	**<0.001**
Correlation	**0.217**

This is statistically significant at the 95% confidence level and indicates that there is a correlation between the two variables. The correlation found was 0.217 which is positive but weak. This showed that as

investors become older they underestimate their results less which infers that older investors might be better at estimating actual returns. This result was is in agreement with Goetzmann, W. N. & Zhu, N. (2002). The fact that returns are more accurate could be due to better awareness of market conditions or less bias towards recent results as they have experienced such market crashes in the past. It could also be due to more wisdom gained from following the stock market or their investments for a longer period of time.

3. Are investors estimations influenced by anchors?

The data obtained from the survey included the original estimate of the fund return as well as the adjusted estimates once the JSE all share return was presented for the same period. The difference between the original and adjusted estimates was needed in order to determine if investors are influenced by an anchor.

A two sided test was required to determine if investors adjust their estimates of returns when presented with an anchor (the JSE all share returns). A two sided test was used as the data first needed to be tested to determine if there was any statistically significant movement, either adjusting higher or lower. If there was a movement, then the direction of this movement needed to be determined.

Table 5: Testing for Anchoring

	Wilcoxon Sign Test			
	Two Sided alternate hypothesis	**p-value**	**One-sided Null Hypothesis**	**p-value**
Estimate vs. Adjusted estimate	**3**	**0.319**	**-**	**-**

3. Two-sided test:

   Ho: median of Estimate - Adjusted Estimate = 0 vs.

   Ha: median of Estimate - Adjusted Estimate ≠ 0

The p-value of 0.319, from table 5, in the two sided test is not significant, thus there is no evidence of a statistical difference between the estimates and adjusted estimates in either direction. Many of the respondents provided the same returns for their adjusted estimates as they had for their initial estimate even though their initial estimate was different to the JSE all share return. There is the possibility that the

anchor was too high compared to respondents' initial estimates, thus they didn't think that it could be possible for their fund to have earned a return as high as the JSE return. There is the additional possibility that respondents did not know that the JSE all share return was the benchmark for their fund, thus when presented with the anchor they were not certain of its relevance to their initial estimate.

Conclusion

Men were found to have higher estimates of their past returns than their female counterparts which is in agreement with literature by Subrahmanyam (2008), among other noted previously. However, as the statistical testing had identified that the entire population was underestimating rather than overestimating their past returns, as was the case with Glaser & Weber (2007), it was determined that men were in fact making better estimates of their past returns due to the fact that they had higher estimates. It was proposed that a possible reason for this was due to women having a stronger negative recall bias as shown by Beyer (1998). The financial crisis of 2008 and the negative market returns experienced during this period may have been a stronger factor in females' estimates than in males' estimates. When analysing the results in aggregate it was found that there were three times as many negative variances between initial estimates and actual fund returns than positive variances.

Once the under confidence had been analysed; tests were performed to determine if there was any evidence that age, as a proxy for experience, decreased the level of any behavioural bias. As under confidence, rather than overconfidence, had been identified, an increase in estimates as respondent's ages increased would show that under confidence decreased as age increased. A positive correlation was found, thus indicating that with age, investors are less prone to behavioural biases as was shown by Goetzmann, W. N. & Zhu, N. (2002).

There was no evidence of anchoring found on the adjusted estimates obtained from investors. This could be due to the fact that respondents did not know that their funds were tracking the JSE all share return as a benchmark. Additionally, the fact that so many investors had underestimated their returns may mean that the JSE all share return was much higher than their estimate and thus they didn't adjust their estimate as the jump was too big. Kahneman et al. (1982) found evidence of anchoring in their testing and Englich et al. (2006) showed that anchoring existed even among experts. The finding in this study is thus contrary to this literature and further investigation of this finding is warranted. However, such investigation is outside the scope of this paper.

Improvements and areas for further research

Some of the respondents in the survey were not sure if they were invested in unit trusts or what the name of the unit trust was. If permission could be obtained from investment houses to send out a survey directly to their investors, this would take out the uncertainty and provide more accurate data for analysis. It would also enable the analysis of overconfidence between investment houses and thus the potential to

determine if a certain fund attracts more overconfident investors than other funds. Furthermore, if investment houses approved thereof, it would enable access to accurate historical returns that could be used to analyse the estimates of each specific individual.

Obtaining the involvement of investment houses could also assist in increasing the response rate to avoid having to test data points, as opposed to individual investors, to allow for a testable sample size. Further methods to enable a larger response such as different types of incentivisation could also be investigated.

Only academics were surveyed in this study and thus by looking at an entire population representative of all investors it would be possible to further analyse overconfidence depending on their particular profession/occupation.

It was noted that investors never estimated negative nominal returns for any fund for any length of time. As noted earlier, the return for the Investec Value Fund for the 12 months ended 30 June 2013 was negative. It was shown that the respondents in total displayed underestimation, however this was not the case for negative returns. The number of returns estimated on the Investec Value Fund over this period (one) showed there was in fact overconfidence and this warrants further investigation. Further work could also be performed to predict if any behavioural biases dissuade an investor from estimating a negative return.

The findings that investors underestimate their return and are not influenced by anchors is contrary to the literature reviewed. The reasons therefore could be further investigated.

References

Alicke, M.D., 1985. Personality Processes and Individual Global Self-Evaluation as Determined by the Desirability and Controllability of Trait Adjectives. *Journal of Personality & Social Psychology*, 49(6), pp.1621–1630.

Alicke, M.D., Vredenburg, D.S. & Hiatt, M., 2001. The "Better Than Myself Effect." *Motivation and Emotion*, 25(1), pp.7–22.

Alpert, M. & Raiffa, H., 1982. A progress report on the training of probability assessors. In D. Kahneman, P. Slovic, & A. Tversky, eds. *Judgment under uncertainty: Heuristics and biases*. Cambridge University Press, pp. 294–305.

Amromin, G. & Sharpe, S.A., 2005. *From the Horse's Mouth: Gauging Conditional expected Stock returns from Investor Survey*, Washington D.C.

Arrow, K.J., 1962. The Economic Learning Implications of by Doing. *The Review of Economic Studies*, 29(3), pp.155–173.

Asch, S.E., 1956. Studies of Independence and Conformity: A Minority of One Against a Unanimous Majority. *Psychological Monographs: General and Applied*, 70(9), pp.1–70.

Ashford, S.J., Lee, C. & Bobko, P., 1989. Content, Causes, and Consequences of Job Insecurity: A Theory Based Measure and Substantive Test. *The Academy of Management Journal*, 32(4), pp.803–829.

Bailey, W., Kumar, A. & Ng, D., 2011. Behavioral biases of mutual fund investors. *Journal of Financial Economics*, 102(1), pp.1–27. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0304405X11001140 [Accessed March 15, 2013].

Baker, H.K. & Nofsinger, J.R., 2002. Psychological Biases of Investors. *Financial Services Review*, 11, pp.97–116.

Barber, B.M. & Odean, T., 2001. Boys Will be Boys: Gender, Overconfidence, and Common Stock Investment. *The Quarterly Journal of Economics*, 116(1), pp.261–292.

Barber, B.M. & Odean, T., 2000. Trading Is Hazardous to Your Wealth: The Common Stock Investment Performance of Individual Investors. *The Journal of Finance*, 55(2), pp.773–806. Available at: http://www.jstor.org/stable/222522?origin=JSTOR-pdf&.

Barberis, N. & Thaler, R., 2003. A Survey of Behavioural Finance. In G. M. Constantinides, M. Harris, & R. Stulz, eds. *Handbook of the Economics of Finance*. Elsevier Science B.V., pp. 1051–1121.

Bateman, I. et al., 1997. Does Part-Whole Bias Exist? An Experimental Investigation. *The Economic Journal*, 107(441), pp.322–332.

Baumeister, R.F. & Newman, L.S., 1994. How stories make sense of personal experiences: Motives that shape autobiographical narratives. *Personality and Social Psychology Bulletin*, 20(6), pp.676–690.

Ben-David, I., Graham, J.R. & Harvey, C.R., 2007. *Managerial Overconfidence and Corporate Policies*, Cambridge.

Bengtsson, C., Persson, M. & Willenhag, P., 2005. Gender and Overconfidence. *Economic Letters*, 86(2), pp.199–203.

Beyer, S., 1998. Gender Differences in Self-Perception and Negative Recall Biases. *Sex Roles*, 38(1/2), pp.103–133.

Beyer, S., 1990. Gender differences in the accuracy of self-evaluations of performance. *Journal of Personality & Social Psychology*, 59(5), pp.960–970.

Bhandari, G. & Deaves, R., 2006. The Demographics of Overconfidence. *Journal of Behavioral Finance*, 7(1), pp.5–11.

Bonanno, G. a. et al., 2002. Self-Enhancement as a Buffer Against Extreme Adversity: Civil War in Bosnia and Traumatic Loss in the United States. *Personality and Social Psychology Bulletin*, 28(2), pp.184–196. Available at: http://psp.sagepub.com/cgi/doi/10.1177/0146167202282005 [Accessed April 3, 2013].

Cambridge, R.M. & Shreckengost, R.C., 1978. Are you sure? The subjective probability assessment test.

Campbell, J.Y. & Shiller, R.J., 2001. *Valuation Ratios and the Long Run Stock Market Outlook: An Update*, Cambridge.

Catsambis, S., 1995. Gender, race, ethnicity, and science education in the middle grades. *Journal of Research in Science Teaching*, 32(3), pp.243–257.

Charness, G. & Rabin, M., 2002. Understanding social preferences with simple tests. *The Quarterly Journal of Economics*, 117(3), pp.817–869.

Chase, W.G. & Simon, H.A., 1973. Perception in Chess. *Cognitive Psychology*, 61(4), pp.55–81.

Chemers, M.M., Hu, L. & Garcia, B.F., 2001. Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology*, 93(1), pp.55–64.

College Board, 1977. Student Descriptive Questionnaire.

Cooper, A.C., Woo, C.Y. & Dunkelberg, W.C., 1988. Entrepreneurs' perceived chances for success. *Journal of Business Venturing*, 3, pp.97–108.

Correl, S.J., 2001. Gender and the Career Choice Process: The Role of Biased Self-Assessments. *American Journal of Sociology*, 106(6), pp.1691–1730.

Coval, J.D. & Moskowitz, T.J., 1999. Home Bias at Home : Local Equity Preference in Domestic Portfolios. *The Journal of Finance*, 54(6), pp.2045–2073.

Cross, K.P., 1977. Not can, but will college teaching be improved? *New Directions for Higher Education*, 1977(17), pp.1–15. Available at: http://dx.doi.org/10.1002/he.36919771703.

Daniel, K., Hirshleifer, D. & Subrahmanyam, A., 1998. Investor Psychology and Security Market Under- and Overreactions. *The Journal of Finance*, 53(6), pp.1839–1885.

Deaux, K. & Farris, E., 1977. Attributing Causes for One's Own Performance: The Effects of Sex, Norms, and Outcome. *Journal of Research in Personality*, 11, pp.59–72.

DeNisi, A.S. & Kluger, A.N., 2000. Feedback Effectiveness: can 360-degree appraisals be improved? *The Academy of Management Executive*, 14(1), pp.129–139.

DePaulo, B.M. et al., 2003. Cues to Deception. *Psychological Bulletin*, 129(1), pp.74–118.

Difonzo, N., Hantula, D.A. & Bordia, P., 1998. Microworlds for experimental research: Having your (control and collection) cake, and realism too. *Behavior Research Methods, Instruments, & Computers*, 30(2), pp.278–286. Available at: http://www.springerlink.com/index/10.3758/BF03200656.

Dunning, D., 1999. A Newer Look : Motivated Social Cognition and the Schematic Representation of Social Concepts. *Psychological Inquiry*, 10(1), pp.1–11.

Dunning, D. et al., 2003. Why people fail to recognize their own incompetence. *Current Directions in Psychological Science*, 12(3), pp.83–87.

Dunning, D., Heath, C. & Suls, J.M., 2004. Flawed Self-Assessment Implications for Health, Education, and the Workplace. *Psychological Science in the Public Interest*, 5(3), pp.69–106. Available at: http://www.jstor.org/stable/40062350.

Dunning, D., Meyerowitz, J.A. & Holzberg, A.D., 1989. Ambiguity and self-evaluation: The role of idiosyncratic trait definitions in self-serving assessments of ability. *Journal of Personality and Social Psychology*, 57(6), pp.1082–1090. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/0022-3514.57.6.1082.

Dunning, D., Perie, M. & Story, A.L., 1991. Self-serving prototypes of social categories. *Journal of Personality & Social Psychology*, 61(6), pp.957–968. Available at: http://www.ncbi.nlm.nih.gov/pubmed/1774633.

Edwards, W., 1968. Conservatism in Human Information Processing. In B. Kleinmutz, ed. *Formal Representation of Human Judgment*. New York: Wiley, pp. 17–52.

Englich, B., Mussweiler, T. & Strack, F., 2006. Playing dice with criminal sentences: the influence of irrelevant anchors on experts' judicial decision making. *Personality and Social Psychology Bulletin*, 32(2), pp.188–200. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16382081 [Accessed May 24, 2013].

Epley, N. & Dunning, D., 2000. Feeling “holier than thou”: Are self-serving assessments produced by errors in self- or social prediction? *Journal of Personality and Social Psychology*, 79(6), pp.861–875. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/0022-3514.79.6.861 [Accessed June 11, 2013].

Epley, N. & Dunning, D., 2006. The mixed blessings of self-knowledge in behavioral prediction: enhanced discrimination but exacerbated bias. *Personality and Social Psychology Bulletin*, 32, pp.641–655. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16702157 [Accessed May 23, 2013].

Ernst, G.W., 1969. Sufficient Conditions for the Success of GPS. *Journal of the Association for Computing Machinery*, 16(4), pp.517–533.

Estes, R. & Hossseini, J., 2001. The Gender Gap on Wall Street: An Empirical Anaalysis of Confidence in Investment Decision Making. *The Journal of Psychology*, 122(6), pp.577–590.

Feng, L. & Seasholes, M.S., 2005. Do Investor Sophistication and Trading Experience Eliminate Behavioral Biases in Financial Markets? *Review of Finance*, 9(3), pp.305–351.

Festinger, L., 1954. A Theory of Social Comparison Processes. *Human Relations*, 7(2), pp.117–140. Available at: http://hum.sagepub.com/cgi/doi/10.1177/001872675400700202 [Accessed February 28, 2013].

Fischhoff, B., Slovic, P. & Lichtenstein, S., 1977. Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human Perception and Performance*, 3(4), pp.552–564. Available at: http://content.apa.org/journals/xhp/3/4/552.

Fischhoff, B., (1975). Hindsight does not equal foresight: The effect of outcome knowledge on judgment under uncertainty. Journal of Experi- mental Psychology: Human Perception and Performance, 1, 288-299.

Franklin, B., 1750. Poor Richard’s Improved Almanack.

Furnham, A., 2001. Self-estimates of intelligence : culture and gender difference in self and other estimates of both general (g) and multiple intelligences. *Personal and Individual Diffences*, 31, pp.1381–1405.

Gervais, S. & Odean, T., 2001. Learning to Be Overconfident. *The Review of Financial Studies*, 14(1), pp.1–27.

Gigerenzer, G., 2004. The irrationality paradox. *Behavioral and Brain Sciences*, 27(03), pp.336–338. Available at: http://www.journals.cambridge.org/abstract_S0140525X04310083.

Gilbert, D. T., (1991). How mental systems believe. American Psychologist, 46, 107-119.

Gilovich, T., Vallone, R. & Tversky, A., 1985. The Hot Hand in Basketball: On the Misperception of Random Sequences. *Cognitive Psychology*, 17, pp.295–314.

Glaser, M. & Weber, M., 2007. Why inexperienced investors do not learn: They do not know their past portfolio performance. *Finance Research Letters*, 4, pp.203–216. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1544612307000463 [Accessed March 9, 2013].

Goetzmann, W.N. & Peles, N., 1997. Cognitive Dissonance and Mutual Fund Investors. *The Journal of Financial Research*, 20(2), pp.145–158.

Goetzmann, W.N. & Zhu, N., 2005. Rain or Shine: Where is the weather effect? *European Financial Management*, 11(5), pp.559–578.

Greenwood, R. & Nagel, S., 2009. Inexperienced investors and bubbles. *Journal of Financial Economics*, 93, pp.239–258. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0304405X09000646 [Accessed March 16, 2013].

Griffin, D.W. & Ross, L., 1991. *Experimental Social Psychology*,

Grinblatt, M. & Keloharju, M., 2001. How Distance , Language , and Culture Influence Stockholdings and Trades. *The Journal of Finance*, 56(3), pp.1053–1073.

Grossman, S.J., Kihlstrom, R.E. & Mirman, L.J., 1977. A Bayesian Approach to the production of Information and learning by Doing. *The Review of Economic Studies*, 44(3), pp.533–547.

Guiso, L., Sapienza, P. & Zingales, L., 2008. Trusting the Stock Market. *The Journal of Finance*, 63(6), pp.2557–2600.

Gysler, M., Kruse, J.B. & Schubert, R., 2002. *Ambiguity and Gender Differences in Financial Decision Making : An Experimental Examination of Competence and Confidence Effects*,

Hansford, B.C. & Hattie, J.A., 1982. The Relationship Between Self and Measures Achievement/Performance. *American Educational Research Association*, 52(1), pp.123–142.

Hayes, a F. & Dunning, D., 1997. Construal processes and trait ambiguity: implications for self-peer agreement in personality judgment. *Journal of Personality & Social Psychology*, 72(3), pp.664–677. Available at: http://www.ncbi.nlm.nih.gov/pubmed/9120790.

Heath, C., Larrick, R.P. & Klayman, J., 1998. Cognitive Repairs: Compensate for Individual Shortcomings. *Research in Organizational Behavior*, 20, pp.1–37.

Hirshleifer, J., 2001. Introduction. In *The Dark Side of the Force: Economic Foundations of Conflict Theory*. Cambridge: Cambridge University Press, p. 355.

Huberman, G., 2001. The Society for Financial Studies. *The Review of Financial Studies*, 14(3), pp.659–680.

Jacobs, J.A., 1996. Gender Inequality and Higher Education. *Annual Review of Sociology*, 22, pp.153–185.

Jacobsen, J.P., 1994. Sex segregation at work: Trends and predictions. *Social Science Journal*, 31(2), p.153.

Jones, K. & Tullous, R., 2002. Behaviairs of Pre-Venture Entrepreneurs and Psrcepticms of Their Financial Needs. *Journal of Small Business Management*, 40(3), pp.233–249.

Jorion, P., 2000. Risk management lessons from Long-Term Capital Management. *European Financial Management*, 6(3), pp.277–300.

Kahneman, D., Knetsch, J.L. & Thaler, R.H., 1991. Anomalies The Endowment Effect , Loss Aversion , and Status Quo Bias. *The Journal of Economic Perspectives*, 5(1), pp.193–206.

Kahneman, D., Knetsch, J.L. & Thaler, R.H., 1990. Experimental Tests of the Endowment Effect and the Coase Theorem. *Journal of Political Economy*, 98(6), pp.1325–1348.

Kahneman, D., Slovic, P. & Tversky, A., 1982. Introduction. In D. Kahneman, P. Slovic, & A. Tversky, eds. *Judgment under uncertainty: Heuristics and biases*. Cambridge: Cambridge University Press, p. 560.

Kahneman, D. & Tversky, A., 1982. The Psychology of Preferences. *Scientific American*, 246(1), pp.160–173.

Kamstra, M.J., Kramer, L.A. & Levi, M.D., 2000. Losing Sleep at the Market : The Daylight Saving Anomaly. *The American Economic Review*, 90(4), pp.1005–1011.

Kaustia, M., Alho, E. & Puttonen, V., 2008. How Much Does Expertise Reduce Behavioral Biases ? The Case of Anchoring Return Effects Estimates in Stock. *Financial Management*, 37(3), pp.391–411.

Kaustia, M. & Knupfer, S., 2008. Do Investors Overweight Personal Experience ? Evidence from IPO Subscriptions. *The Journal of Finance*, 63(6), pp.2679–2702.

Klein, W.M., 1997. Objective standards are not enough: affective, self-evaluative, and behavioral responses to social comparison information. *Journal of Personality & Social Psychology*, 72(4), pp.763–774. Available at: http://www.ncbi.nlm.nih.gov/pubmed/9108694.

Kluger, A.N. & Denisi, A., 1996. The Effects of Feedback Interventions on Performance : A Historical Review, a Meta-Analysis, and a Preliminary Feedback Intervention Theory. *Psychological Bulletin*, 119(2), pp.254–284.

Knetsch, J.L., 1989. The Endowment Effect and Evidence of Nonreversible Indifference Curves. *The American Economic Review*, 79(5), pp.1277–1284.

Kruger, J. & Dunning, D., 1999. Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *Journal of personality and social psychology*, 77(6), pp.1121–34. Available at: http://www.ncbi.nlm.nih.gov/pubmed/10626367.

Kunda, Z., 1990. The Case for Motivated Reasoning. *Psychological Bulletin*, 108(3), pp.480–498.

Lahav, Y., Noussair, C.N. & Haruvy, E., 2007. Traders' in Asset Markets: Evidence Expectations Experimental. *The American Economic Review*, 97(5), pp.1901–1920.

Landier, A. & Thesmar, D., 2008. Financial Contracting with Optimistic Entrepreneurs. *Review of Financial Studies*, 22(1), pp.117–150. Available at: http://rfs.oxfordjournals.org/cgi/doi/10.1093/rfs/hhn065 [Accessed June 4, 2014].

Langevoort, D.C., 2001. Seeking Sunlight in Santa Fe's Shadow: The SEC 's Pursuit of Managerial Accountability. *Washington University Law Review*, 79(2), pp.449–492.

Larson, J.R., 1989. Dynamic Interplay Between Employees' Strategies and Supervisors' of Delivery Performance Feedback. *The Academy of Management Review*, 14(3), pp.408–422.

Lewellen, W.G., Lease, R.C. & Schlarbaum, G.G., 1977. Patterns of Investment Strategy and Behavior Among Individual Investors. *The Journal of Business*, 50(3), pp.296–333.

Lichtenstein, S. & Fischhoff, B., 1981. *The Effects of Gender and Instructions on Calibration*,

List, J.A., 2003. Does market experience eliminate market anomalies? *The Quarterly Journal of Economics*, 1, pp.41–71. Available at: http://qje.oxfordjournals.org/.

Locke, P.R. & Mann, S.C., 2005. Professional Trader Discipline and Trade Disposition. *Journal of Financial Economics*, 76(2), pp.401–444.

Locke, P.R. & Onayev, Z., 2005. Trade Duration: Information and Trade Disposition. *The Financial Review*, 40(1), pp.113–129. Available at: http://doi.wiley.com/10.1111/j.0732-8516.2005.00095.x.

Loftus, E.F. & Wagenaart, W.A., 1988. Lawyers' Prediction of Success. *Jurimetrics*, 14(2), pp.173–192.

Lopes, L. L., (1985). Averaging rules and adjustment processes in Bayesian inference. Bulletin of the Psychonomic Society, 23, 509-512.

Lundeberg, M.A., Fox, P.W. & Puncochaf, J., 1994. Highly Confident but Wrong : Gender Differences and Similarities in Confidence Judgments. *Journal of Educational Psychology*, 86(1), pp.114–121.

Malmendier, U. & Nagel, S., 2011. Depression Babies: Do Macroeconomic Experiences Affect Risk Taking? *The Quarterly Journal of Economics*, 126(1), pp.373–416.

Malmendier, U. & Tate, G., 2005. Does Overconfidence Affect Corporate Investment? CEO Overconfidence Measures Revisited. *European Financial Management*, 11(5), pp.649–659. Available at: http://doi.wiley.com/10.1111/j.1354-7798.2005.00302.x.

McIlwee, J.S. & Robinson, J.G., 1992. *Women in engineering: Gender, power, and workplace culture*, Albany: State University of New York Press.

Meehan, A.M. & Overton, W.F., 1986. Gender Differences in Expectancies for Success and Performance on Piagetian Spatial Tasks. *Merrill-Palmer Quarterly*, 32(4), pp.427–441.

Miller, D.T. & McFarland, C., 1987. Pluralistic ignorance: When similarity is interpreted as dissimilarity. *Journal of Personality and Social Psychology*, 53(2), pp.298–305.

Moore, D. a & Kim, T.G., 2003. Myopic social prediction and the solo comparison effect. *Journal of personality and social psychology*, 85(6), pp.1121–35. Available at: http://www.ncbi.nlm.nih.gov/pubmed/14674818 [Accessed April 9, 2013].

Newby-Clark, I.R. et al., 2000. People focus on optimistic scenarios and disregard pessimistic scenarios while predicting task completion times. *Journal of Experimental Psychology: Applied*, 6(3), pp.171–182. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037/1076-898X.6.3.171 [Accessed June 26, 2013].

Nisbett, R.E. & Ross, L., 1980. *Human Inference: Strategies and Shortcomings of Social Judgement*, Engelwood Cliffs: NJ: Prentice-Hall.

Northcraft, G.B. & Neale, M.A., 1987. Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organizational Behavior and Human Decision Processes*, 39, pp.84–97. Available at: http://linkinghub.elsevier.com/retrieve/pii/074959788790046X.

Odean, T., 1997. Do Investors Trade Too Much? *American Economic Review*, 89(5), pp.1279–1298.

Odean, T., 1998. Volume, Volatility, Price, and Profit When All Traders Are Above Average. *The Journal of Finance*, 53(6), pp.1887–1934.

Owhoso, V. & Weickgenannt, A., 2009. Auditors' self-perceived abilities in conducting domain audits. *Critical Perspectives on Accounting*, 20, pp.3–21. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1045235407000676 [Accessed June 24, 2013].

Plous, S., 1995. A Comparison of Strategies for Reducing Interval Overconfidence in Group Judgements. *Journal of Applied Psychology*, 80(4), pp.443–454.

Pope, A. & Butt, J.E., 1969. *The Poems of Alexander Pope*, Methuen. Available at: http://www.ncbi.nlm.nih.gov/pubmed/10885437.

Powell, M. & Ansic, D., 1997. Gender differences in risk behaviour in financial decision-making: an experimental analysis. *Journal of Economic Psychology*, 18, pp.605–628.

Presser, S. et al., 2004. Methods for Testing and Evaluating Survey Questions. *Public Opinion Quarterly*, 68(1), pp.109–130.

Prince, M., 1993. Women, men and money styles. *Journal of Economic Psychology*, 14, pp.175–182. Available at: http://linkinghub.elsevier.com/retrieve/pii/016748709390045M.

Pronin, E., Lin, D.Y. & Ross, L., 2002. The Bias Blind Spot: Perceptions of Bias in Self Versus Others. *Personality and Social Psychology Bulletin*, 28, pp.369–381.

Pronin, E., Puccio, C. & Ross, L., 2002. Understanding Misunderstanding. In T. Gilovich, D. Griffin, & D. Kahneman, eds. *Heuristics and Biases: The Psychology of Intuitive Judgement*. Cambridge University Press, pp. 636–665.

Quattrone, G. A., Lawrence, C. P., Finkel, S. E., & Andrus, D. C., (1984). Explorations in anchoring: The effects of prior range, anchor extremity, and suggestive hints. Unpublished manuscript, Stanford University, Stanford, California.

Rammstedt, B. & Rammsayer, T.H., 2002. Gender differences in self-estimated intelligence and their relation to gender-role orientation. *European Journal of Personality*, 16, pp.369–382. Available at: http://doi.wiley.com/10.1002/per.454.

Read, D. & van Leeuwen, B., 1998. Organizational Behaviour and Human Decision Process. *Organizational Behaviour and Human Decision Processes*, 76(2), pp.189–205.

Read, D. & van Leeuwen, B., 1998. Predicting Hunger: The Effects of Appetite and Delay on Choice. *Organizational Behavior and Human Decision Processes*, 76(2), pp.189–205. Available at: http://www.ncbi.nlm.nih.gov/pubmed/9831521.

Reskin, B., 1993. Sex Segregation in the workplace. *Annual Review of Sociology*, 19, pp.241–270.

Ritter, J.R., 2003. Behavioral Finance. *Pacific-Basin Finance Journal*, 11(4), pp.429–437.

Ross, L. & Ward, A., 1995. *Naive Realism: Implications for Social Conflict and Misunderstanding*, Stanford, California.

Rutter, D.R., Quine, L. & Albery, I.P., 1998. Perceptions of Risk in Motorcyclists: Unrealistic optimism, Relative Realism and Predictions of Behaviour. *British Journal of Psychology*, 89, pp.681–696.

Saunders, E.M., 1993. Stock Prices and Wall Street Weather. *The American Economic Review*, 83(5), pp.1337–1345.

Seru, A., Shumway, T. & Stoffman, N., 2010. Learning by Trading. *Review of Financial Studies*, 23(2), pp.705–739. Available at: http://rfs.oxfordjournals.org/cgi/doi/10.1093/rfs/hhp060 [Accessed March 20, 2013].

Shapira, Z. & Venezia, I., 2001. Patterns of Behavior of Professionally Managed and Independent Investors. *Journal of Banking & Finance*, 25(8), pp.1573–1587.

Shefrin, H. & Statman, M., 1984. The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. *The Journal of Finance*, 40(3), pp.777–790. Available at: http://www.jstor.org/stable/2327802.

Slovic, P., & Lichtenstein, S., (1971). Comparison of Bayesian and regression approaches to the study of information processing in judgment. Organizational Behavior and Human Performance, 6, 649-744.

Smith, V.L., Suchanek, G.L. & Williams, A.W., 1988. Bubbles, Crashes, and Endogenous Expectations in Experimental Spot Asset Markets. *Econometrica*, 56(5), pp.1119–1151.

Story, A.L., 2003. Similarity of trait construal and consensus in interpersonal perception. *Journal of Experimental Social Psychology*, 39, pp.364–370. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0022103102005292 [Accessed March 29, 2013].

Subrahmanyam, A., 2008. Behavioural Finance: A Review and Synthesis. *European Financial Management*, 14(1), pp.12–29. Available at: http://doi.wiley.com/10.1111/j.1468-036X.2007.00415.x [Accessed April 28, 2014].

Suls, J., Lemos, K. & Stewart, H.L., 2002. Self-esteem, Construal, and Comparisons With the Self, Friends, and Peers. *Journal of Personality & Social Psychology*, 82(2), pp.252–261. Available at: http://doi.apa.org/getdoi.cfm?doi=10.1037//0022-3514.82.2.252 [Accessed March 19, 2013].

Suls, J., Martin, R. & Wheeler, L., 2002. Social Comparison: Why, With Whom, and With What Effect ? *Current Directions in Psychological Science*, 11(5), pp.159–163. Available at: http://www.jstor.org/stable/20182799.

Switzer III, F.S. & Sniezek, J.A., 1991. Judgment Processes in Motivation: Anchoring and Adjustment Effects on Judgment and Behavior. *Organizational Behaviour and Human Decision Processes*, 49, pp.208–229.

Taylor, S.E., Lichtman, R.R. & Wood, J. V, 1984. Attributions, beliefs about control, and adjustment to breast cancer. *Journal of personality and social psychology*, 46(3), pp.489–502. Available at: http://www.ncbi.nlm.nih.gov/pubmed/6707865.

Tippett, M., 1994. Estimating Returns on Financial Instruments: Time versus Money-Weighted Returns. *Journal of Business Finance and Accounting*, 21, pp.729–738.

Tourani-Rad, A. & Kirkby, S., 2005. Investigation of investors' overconfidence, familiarity and socialization. *Accounting and Finance*, 45, pp.283–300. Available at: http://doi.wiley.com/10.1111/j.1467-629x.2004.00131.x [Accessed May 3, 2013].

Tversky, A. & Kahneman, D., 1986. Rational Choice and the Framing of Decisions. *The Journal of Business*, 59(4, Part 2: The Behavioral Foundations of Economic Theory), pp.S251–S278.

Vissing-Jorgensen, A. & Attanasio, O.P., 2003. Stock-Market Substitution, Intertemporal Participation and Risk Aversion. *The American Economic Review*, 93(2), pp.383–391.

Wansink, B., Kent, R.J. & Hoch, S.J., 1998. An Anchoring and Adjustment Model of Purchase Quantity Decisions. *Journal of Marketing Research*, 35(1), pp.71–81.

Wegerif, R., Mercer, N. & Dawes, L., 1999. From social interaction to individual reasoning: an empirical investigation of a possible socio-cultural model of cognitive development. *Learning and Instruction*, 9, pp.493–516. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0959475299000134.

Weinstein, N.D., 1982. Unrealistic Optimism About Susceptibility to Health Problems. *Journal of Behavioural Medicine*, 5(4), pp.441–460.

Wilde, O., 1900. Quote.

Williams, E.F. & Gilovich, T., 2008. Do people really believe they are above average? *Journal of Experimental Social Psychology*, 44, pp.1121–1128. Available at: http://linkinghub.elsevier.com/retrieve/pii/S002210310800005X [Accessed April 19, 2013].

Willimack, D.K. et al., 2004. Evolution and Adaptation of Questionnaire Development, Evaluation, and Testing Methods for Establishment Surveys. In S. Presser et al., eds. *Methods for Testing and Evaluating Survey Questionaires*. New York: Wiley.

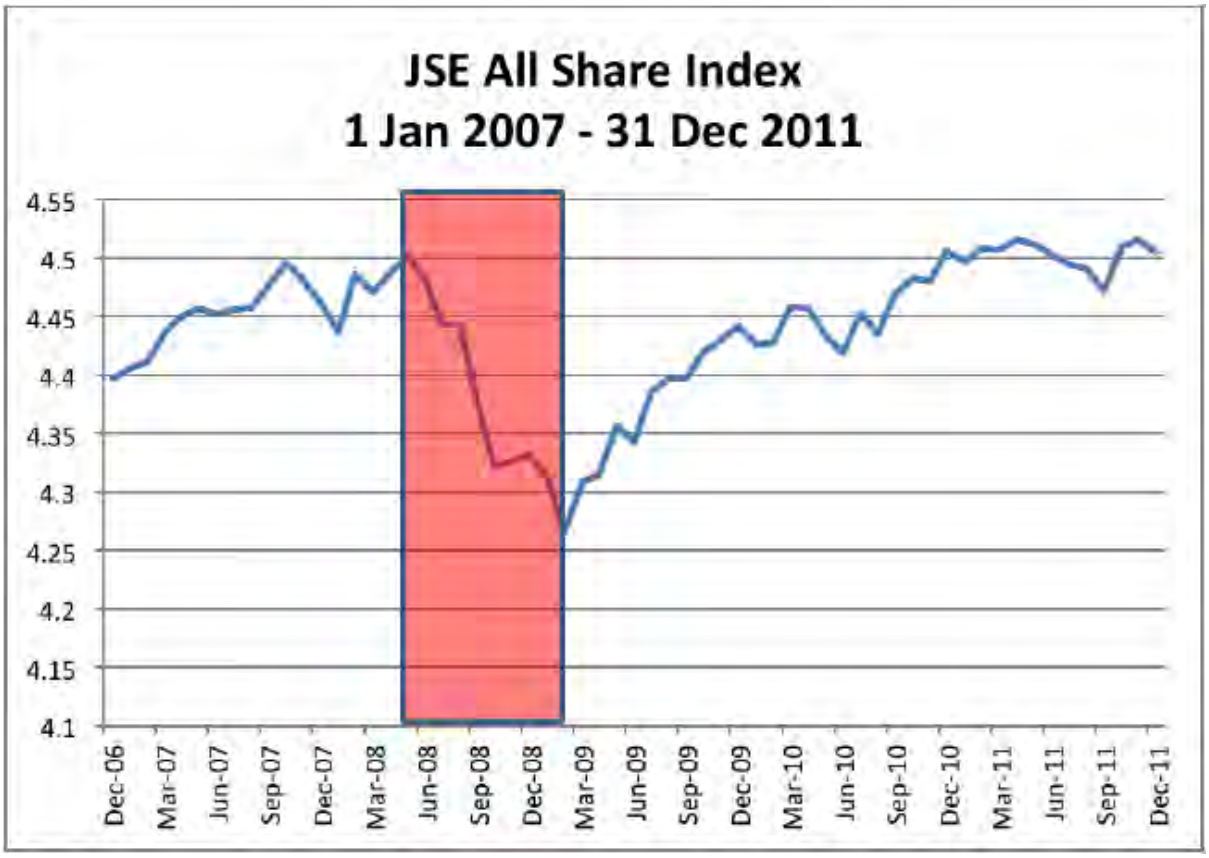
Willows, G., 2012. *She's Built For It: Differential Investment Performance in South Africa Based on Gender*. University of Cape Town.

Wilson, T.D. et al., 1996. A new look at anchoring effects: basic anchoring and its antecedents. *Journal of Experimental Psychology: General*, 125(4), pp.387–402. Available at: http://www.ncbi.nlm.nih.gov/pubmed/8945789.

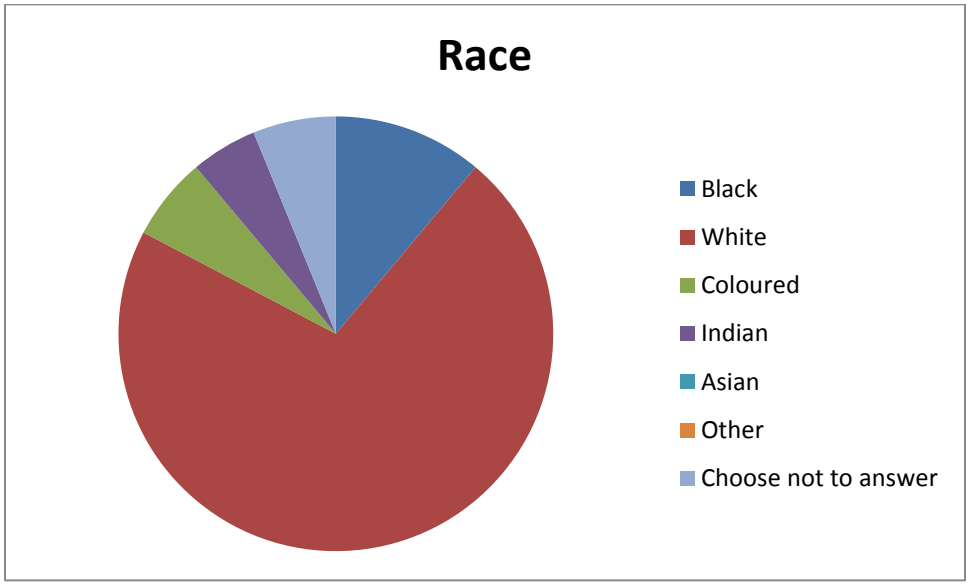
Windschitl, P.D., Kruger, J. & Simms, E.N., 2003. The influence of egocentrism and focalism on people's optimism in competitions: when what affects us equally affects me more. *Journal of Personality & Social Psychology*, 85(3), pp.389–408. Available at: http://www.ncbi.nlm.nih.gov/pubmed/14498778 [Accessed April 4, 2013].

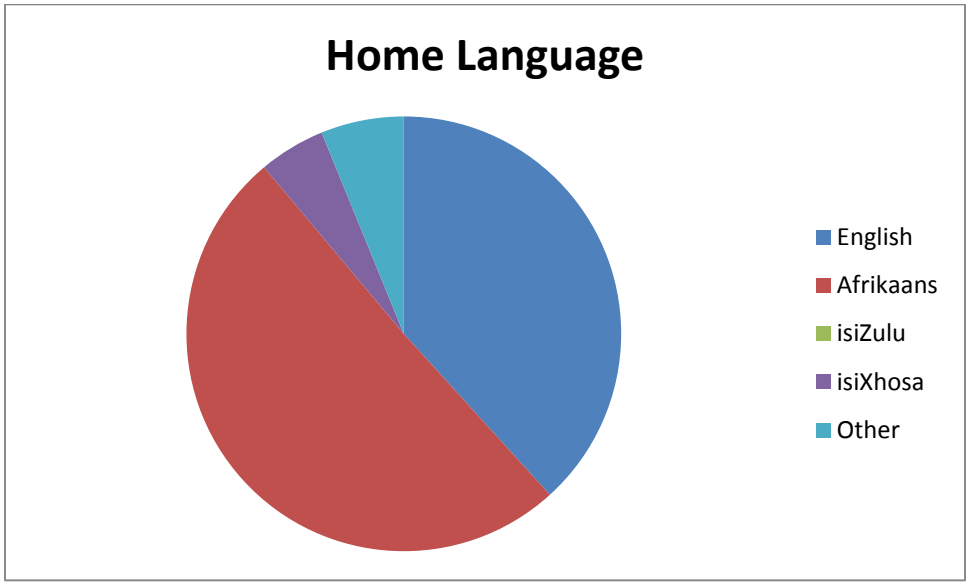
Appendix

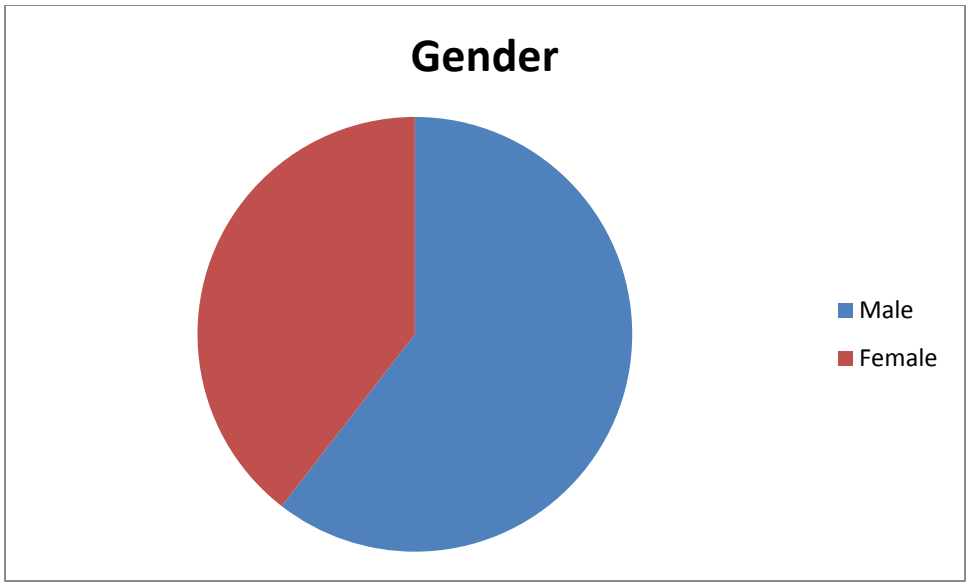
1. JSE All Share Index (Willows, 2012)

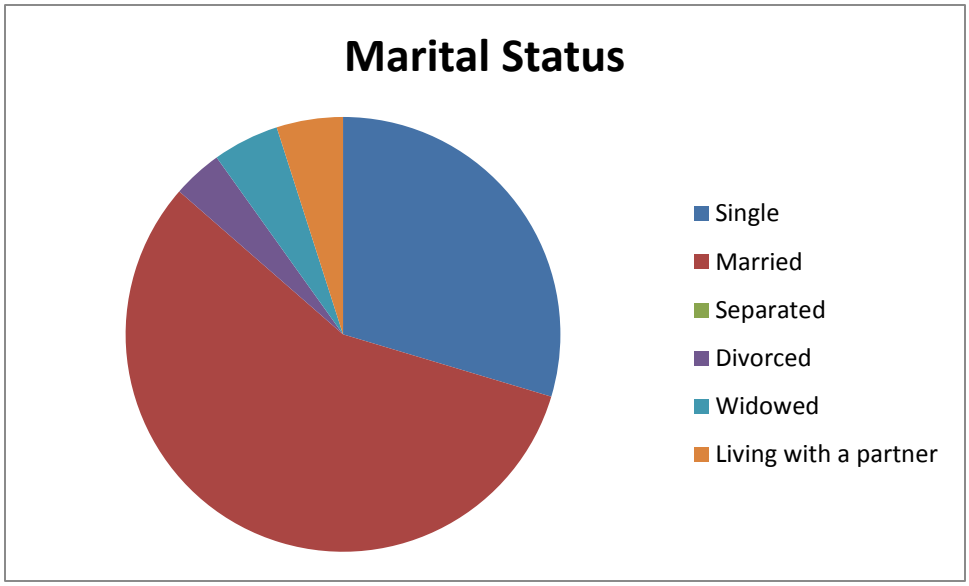


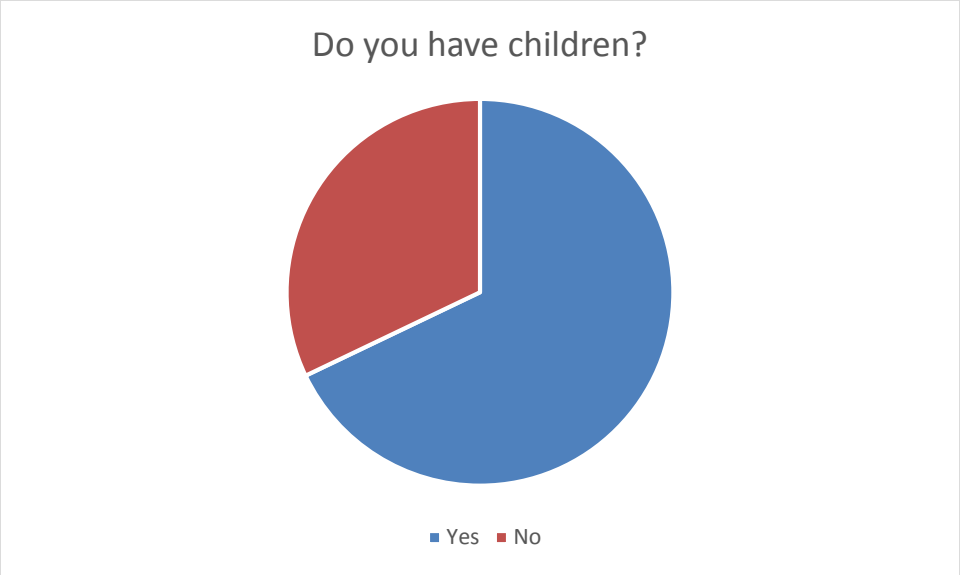
2. Demographics of 41 tested respondents



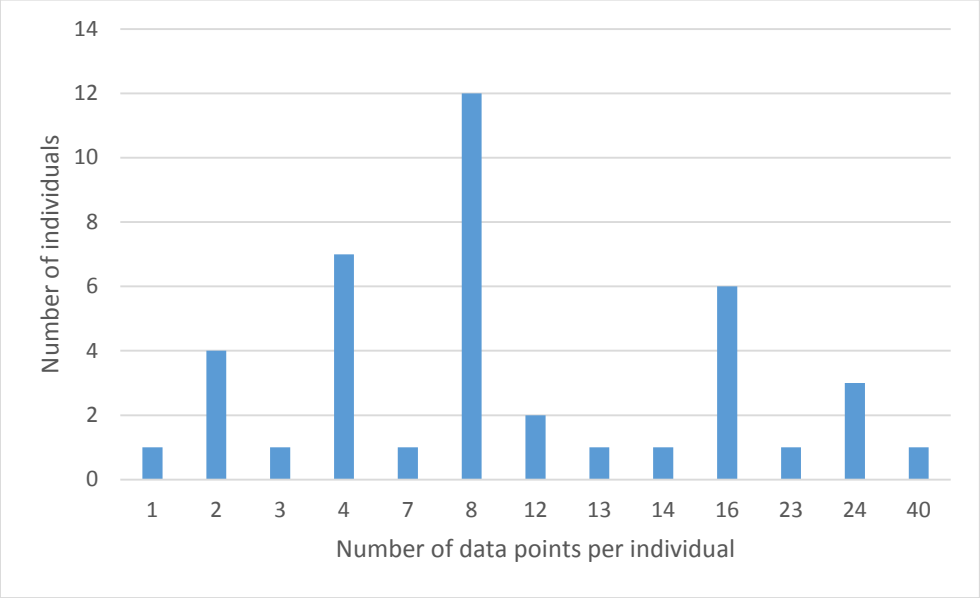



Gender
Male
Female

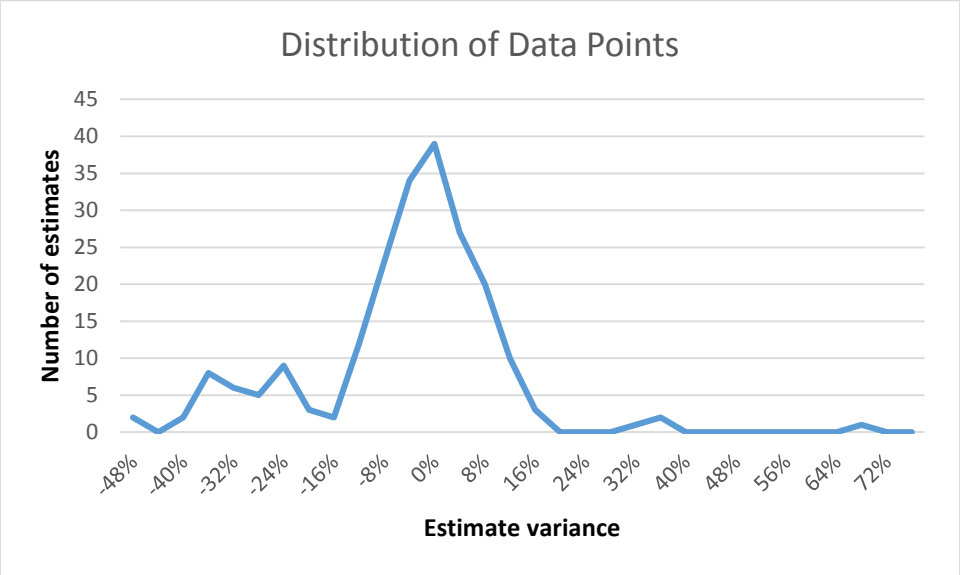

Marital Status
Single
Married
Separated
Divorced
Widowed
Living with a partner



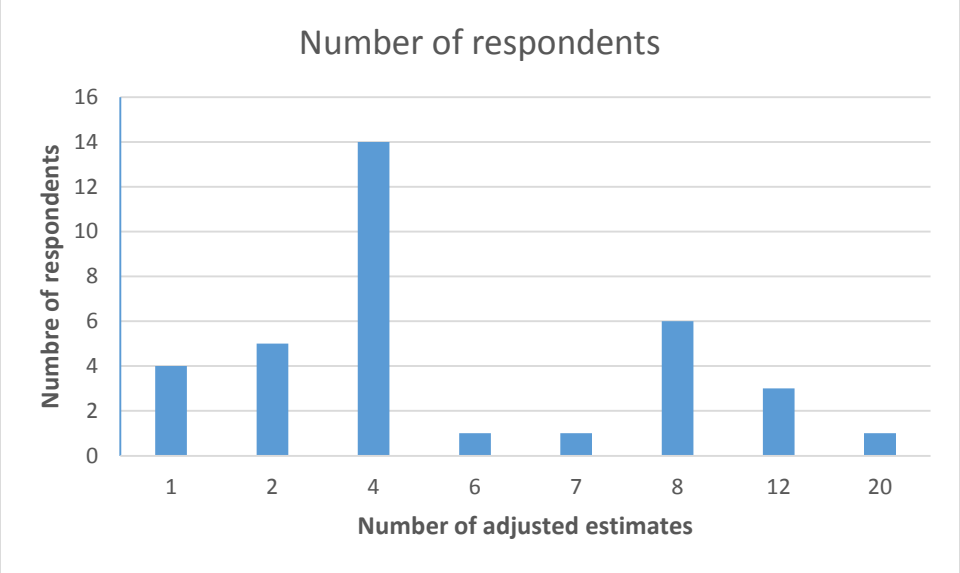
3. Distribution of data points per individual



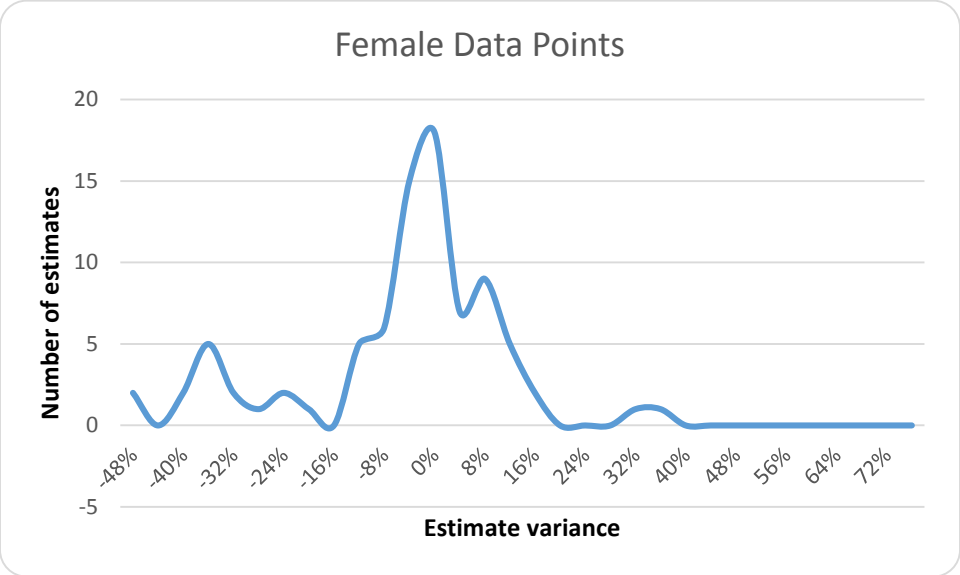
4. Distribution of estimate data points



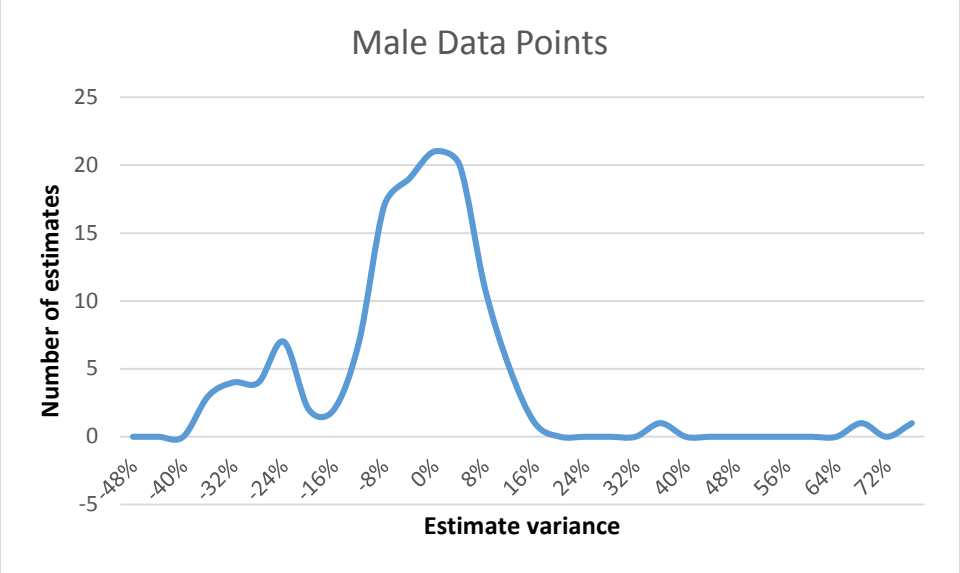
5. Distribution of adjusted estimates



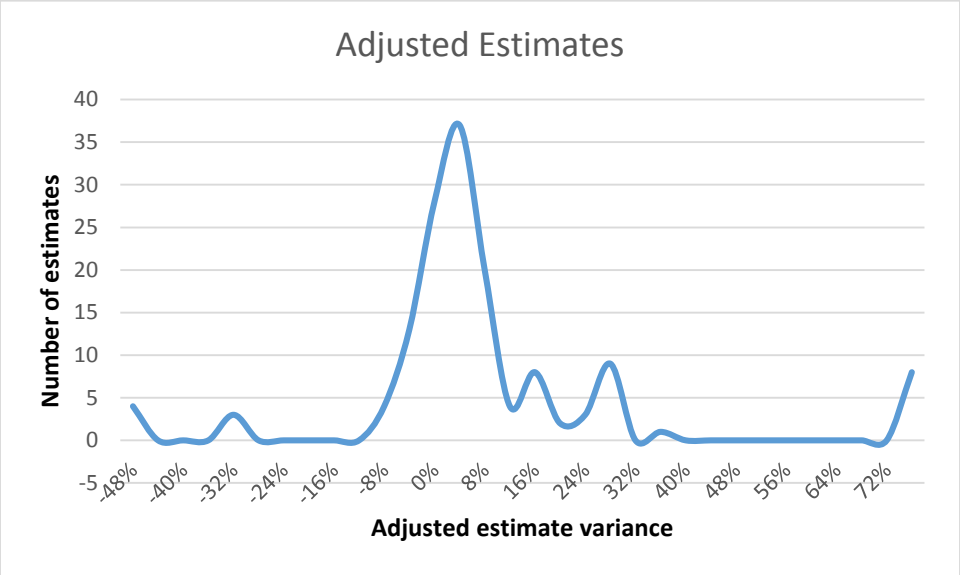
6. Female Data Points



7. Male Data Points



8. Adjusted Estimates



9. Qualtrics Survey

Not all demographic information was used in the testing for the purpose of this dissertation but was included for completeness sake

Default Question Block

The aim of this research is to determine the accuracy with which investors are able to estimate the past returns of the equity unit trusts that they directly invest in as well as attempting to identify some of the behavioural biases that investors are prone to exhibit.

This research has been approved by the Commerce Faculty Ethics in Research Committee.

Your participation in this research is voluntary. You can choose to withdraw from the research at any time.

The questionnaire will take approximately 5 minutes to complete
If you have any queries please contact Glen Dowie on (021) 650 2278

Do you agree to participate?

- Yes
- No

What year were you born in?

Gender:

- Male
- Female

Race:

- Black
- White
- Coloured
- Indian
- Asian
- Other
- Choose not to answer

What is your home language?

- English
- Afrikaans
- IsiZulu
- IsiXhosa
- Other

Please indicate your marital status:

Do you have children?

- Yes

No

If so, how old are they (in years)?

First Child
Second Child
Third Child
Fourth Child
Fifth Child
Sixth Child
Seventh Child

Do you directly invest in a South African unit trust (i.e. not via a pension fund, retirement fund or provident fund)?

- Yes
- No

How would you rate your investment knowledge?

- Poor
- Fair
- Good
- Very Good
- Excellent

What is your highest qualification?

What Faculty do you work in?

- Commerce
- Engineering and the Built Environment
- Health Sciences
- Humanities
- Law
- Science
- Other

Are you:

- Academic Staff
- PASS Staff

If Academic Staff, what is your job position?

- Teaching Assistant
- Lecturer
- Senior Lecturer
- Associate Professor
- Professor

Are any of the unit trusts that you are directly invested in South African equity only unit trusts? I.e. The unit trust only invests in shares of South African companies.

- Yes
- No

Please can you tell us why you don't directly invest in a Unit trust (you may select more than one answer):

- [ ] I invest in alternative ways
- [ ] The returns are not sufficient
- [ ] The risk is too high
- [ ] The management fees are too high
- [ ] I don't have enough money
- [ ] Someone else invests for me on my behalf
- [ ] I don't understand what unit trusts are
- [ ] Other

Please can you tell us why you don't directly invest in a South African equity only unit trust (you may select more than one answer):

- [ ] I prefer to invest in foreign equity
- [ ] The risk is too high
- [ ] The management fees are too high
- [ ] The returns are not sufficient
- [ ] Someone else invests for me on my behalf
- [ ] Other:

Please select which South African equity unit trust/s you are currently directly invested in:

- [ ] Allan Gray Equity Fund
- [ ] Coronation Equity Fund
- [ ] Coronation Top 20 Fund
- [ ] Foord Equity Fund
- [ ] Investec Equity Fund
- [ ] Investec Value Fund
- [ ] Momentum Equity Fund
- [ ] Nedgroup Investments Rainmaker Fund
- [ ] Nedgroup Investments Value Fund
- [ ] Oasis Crescent Equity Fund
- [ ] Old Mutual Investors Fund
- [ ] Prudential Dividend Maximiser Fund
- [ ] SIM General Equity Fund
- [ ] Other 1 (Please Specify

Other 2 (Please Specify)

Other 3 (Please Specify)

In what year did you start investing in the (actual or nearest estimate):

Allan Gray Equity Fund	
Coronation Equity Fund	
Coronation Top 20 Fund	
Foord Equity Fund	
Investec Equity Fund	
Investec Value Fund	
Momentum Equity Fund	
Nedgroup Investments Rainmaker Fund	
Nedgroup Investments Value Fund	
Oasis Crescent Equity Fund	
Old Mutual Investors Fund	
Prudential DIVidend MaxImiser Fund	
SIM General Equity Fund	
${q://QID6/ChoiceTextEntryValue/17}	
${q://QID6/ChoiceTextEntryValue/15}	
${q://QID6/ChoiceTextEntryValue/16}	

For the following questions you will need to understand the difference between cumulative and annualised returns, so please read the following example:
If you had a portfolio and invested R100 today and in 3 years time it is worth R130, you would have a:
Cumulative return of 30% (130-100) / 100; and an
Annualised return of 10% (130-100) / 100 / 3 years

Don't look at your fund fact sheet!

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Allan Gray Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)	
3 Years ending 30 June 2013 (%)	
5 Years ending 30 June 2013 (%)	
10 Years ending 30 June 2013 (%)	

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Coronation Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Coronation Top 20 Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Foord Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Investec Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Investec Value Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Momentum Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Nedgroup Investments Rainmaker Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Nedgroup Investments Value Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

6 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Oasis Crescent Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Old Mutual Investors Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **Prudential Dividend Maximiser Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the **SIM General Equity Fund**, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the ${q://QID6/ChoiceTextEntryValue/17} fund you included, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the ${q://QID6/ChoiceTextEntryValue/15} fund you included, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

What do you think your annualised percentage (i.e. not cumulative) returns are for the following periods for the ${q://QID6/ChoiceTextEntryValue/16} fund you included, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

The JSE All Share Index had the following returns over the same periods:

12 Months ending 30 June 2013	3 Years ending 30 June 2013	5 Years ending 30 June 2013	10 Years ending 30 June 2013
17.41%	16.91%	6.03%	37.39%

With these JSE returns in mind, what do you think your annualised percentage returns are for the following periods for the:

Allan Gray Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Coronation Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Coronation Top 20 Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Foord Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Investec Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Investec Value Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Momentum Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Nedgroup Investments Rainmaker Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Nedgroup Investments Value Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Oasis Crescent Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Old Mutual Investors Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Prudential Dividend Maximiser Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

SIM General Equity Fund, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

${q://QID6/ChoiceTextEntryValue/17}, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

${q://QID6/ChoiceTextEntryValue/15}, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

${q://QID6/ChoiceTextEntryValue/16}, where applicable:

12 Months ending 30 June 2013 (%)

3 Years ending 30 June 2013 (%)

5 Years ending 30 June 2013 (%)

10 Years ending 30 June 2013 (%)

Block 1