2.1 INVESTOR BIASES

Festinger (1957), renowned psychologist was the first to give the theory about cognitive dissonance. Several empirical studies have confirmed the influence of cognitive biases during investment decisions. A review of such studies is summarized below. Each of the studies indicates that the investor is not always rational and is predisposed to certain kind of biases. All reviewed papers are included below. Literature reviewed on general cognitive biases are documented first, followed by the biases taken up for the study, i.e. Overconfidence Bias, Self Attribution Bias, Illusion of Control, Loss Aversion and Herding Mentality.

Erlich et al (1957) examined consumer response to advertising after a major purchase decision like a new car. They observed that new car owners selectively choose advertisements that reinforced the efficacy of their recent purchase decision. The advertisement reduced the uncertainty they felt about the wisdom of their choice.

De Bondt & Thaler (1985) in their paper on ‘Does Stock Market Overreact?’ in their study on whether overreaction affects stock prices, argue that mean reversion in stock prices is evidence of investor over reaction where investors overemphasizes recent firm performance in forming future expectations. Porfolios of prior losers are found to outperform prior winners

Ippolito (1992) in his paper, ‘Consumer’s reaction to measures of poor quality evidence from the mutual fund industry’, show that investor dollars flow into winning funds more rapidly than they flow out of losing funds.
**Delong et al (1990)** presents a simple model of an asset market in which irrational noise traders with erroneous stochastic beliefs both affect prices and earn higher expected returns. The unpredictability of noise traders belief creates a risk in the price of asset that deters rational arbitrageurs from aggressively betting on them. As a result prices diverge significantly. This model sheds light on a number of financial anomalies.

**Goetzmann & Peles (1997)** present evidence from the questionnaire studies of mutual fund investors about recollection of past fund performance. The magnitude of psychological and economic frictions in the mutual fund industry was examined via a cross-sectional study of equity mutual funds. They found that investor memories exhibit a positive bias, consistent with current psychological models. Even relatively sophisticated investors display a positive bias in their recollection of past fund performance. They also found that the degree of bias is conditional upon previous investor choice, a phenomenon related to the well-known theory of cognitive dissonance. They found an unusually high frequency of poorly performing funds, consistent with investor inertia.

**Fischhoff (1975)** was the first to study one of the most relevant memory distortion called the hindsight bias. It is the tendency of a person to distort a previous judgment in the direction of a new information after learning the real outcome of a situation or the correct answer to a question. Baruch Fischhoff described an experiment in which he asked the subjects questions on general knowledge (questions from almanacs and encyclopedia). After revealing the correct answer, he asked his subjects to recall original responses from memory. In general people overestimated the quality of their initial knowledge and forgot their initial errors.

**Camerer et al (1989)** in their paper ‘The Curse of Knowledge in Economic Setting’ suggest pessimism about learning from personal experience and from
others. They find that hindsight bias narrows the gap between what occurred and what predictions are recalled, reducing valuable feedback and inhibiting learning.

Werth et al (2002), in their paper, ‘Certainty and Uncertainty: the two faces of hindsight bias. Organisational Behavior and Human Decision Process’ found that an individual’s high confidence levels in their prior estimates, i.e. those made before knowing the outcome information, and a low confidence level in their recalled estimates, after receiving the outcome information will induce hindsight bias for the subject.

Monti & Paolo investigated the relationship between investment decision making and hindsight bias. They found strong evidence that hindsight bias can have on the investor’s portfolio decision. To identify hindsight bias effect, they analyzed subjects overall perceived error by focusing on the causal relations between estimate and memory errors. They experimentally tested PhD students in economics and financial advisors. The participants were asked to forecast economic scenarios and to accordingly decide how to invest their money after reading an article about the state of a hypothetic economy. About half of the students and two third of financial advisors belonging to the test groups confused their original predictions with the information they received at the end of the test, thereby revealing hindsight bias.

Tetlock (2005), a psychologist at the University of California, Berkeley, carried out one of the biggest exercises on testing predictions. In the experiment, Tetlock chose 284 people, who made a living by predicting political and economic trends. Over the next 20 years, he asked them to make nearly 100 predictions each, on a variety of likely future events. With more than 28000 predictions, he assessed their results and concluded that on an average, experts did only a little better than ‘a dart throwing chimpanzee’ and by some measure no better at all. Also Tetlock identified the traits that made for more or less successful punditry. Those who did
particularly bad were not comfortable with uncertainty and complexity and sought to reduce the problem to some theoretical scheme. These experts were more confident than the others that their predictions were accurate. It is interesting to note that the experts who were more accurate than others, tended to be much less confident that they were right.

**Bias & Martin Weber (2008)**, in testing the hypothesis that hindsight bias hinders learning about risk, they conducted a lab experiment with 67 students from Mannheim University. They gave the participants financial data and asked them to estimate the variances. Then gave them new data and asked them to estimate variances again. The idea was to study how participants process this new data to update their volatility estimates. The experiment involved two treatments, one in which the participants were reminded of their initial estimates, thus muting their bias, and in the second one the participants were asked to remember their initial estimates, so that the bias could manifest itself. Agents gave lower volatility updates in the second treatment than in the first confirming hindsight bias.

In another experiment to test the hypothesis that hindsight bias hurts financial performance, they collected psychometric and performance data about highly paid investment bankers. They found that they exhibited hindsight bias when asked questions about economics, banking and finance and that experience does not reduce this bias. They also found that bankers with low bias obtain significantly better performance.

### 2.2 OVERCONFIDENCE BIAS

The overconfidence bias suggest that the investors systematically misprocess publicly available information and considerable research suggests that people are
overconfident and that investors in particular are overconfident about their abilities to predict the future. A brief summary of the review under over confidence bias is presented below.

Fischhoff et al (1977) observed that people are poorly calibrated, when estimating probabilities. Events which they think are certain to occur actually occur only 80 percent of the time, and events they think are impossible occur approximately 20 percent of the time.

Lawellen et al (1977) on survey answers and brokerage records in the United States revealed that men behave more like overconfident investors than women. Men spend more time and money on security analysis, rely less on their brokers, make more transactions, believe that returns are highly predictable, and anticipate higher possible returns than do women.

Odean (1998) in his paper titled ‘Volume, Volatility, Price and Profit When All Traders Are Above Average’, examines markets in which price taking traders, a strategic trading insider and risk averse market makers are overconfident. Overconfident traders can cause markets to under react to information of rational traders. Markets also under react to abstract, statistical and highly relevant information, and they overreact to salient, anecdotal and less relevant information.

Camerer & Lovallo (1999), found that overconfidence and optimism leads to excessive business entry. The paper explored whether optimistic biases could plausibly and predictably influence economic behavior. They created an experimental setting with basic features of business entry situations. In the experiments, the successs of entering subjects depends on their relative skill compare dto other entrants. Most subjects who entered thought that the total profit earned by all entrants will be negative, but their own profit will be positive. These
findings are consistent with the prediction that overconfidence leads to excessive business entry.

Clarke & Statman (2000) demonstrated prediction overconfidence when they surveyed investors with the question “In 1896, the Dow Jones Average, which is a price index that does not include dividend reinvestment, was at 40. In 1998, it crossed 9000. If dividends had been reinvested, what do you think the value of DJIA would be in 1998? In addition to that guess, also predict a high and low range so that you feel 90 percent confident that your answer is between high and low guesses.” In the survey few responses reasonably approximated the potential 1998 value of Dow and no one estimated a correct confidence interval.

Shefrin (2000) describes overconfidence with an example of driving. A research group was asked regarding their driving ability and between 65 and 80 percent of the respondents rated themselves above average. In reality he feels only half of us can be if the trait is symmetrically distributed.

Nofsinger (2001) in his book ‘The Psychology of Investing’, noted that specific security selection is a highly difficult task and in this type of activity is precisely where people exhibit overconfidence. Psychologists have determined that overconfidence causes people to overestimate their knowledge, underestimate risks and exaggerate their ability to control events.

Gervais & Odean (2001) in their paper titled ‘Learning to be Overconfident’ have theoretically explained that the level of overconfidence decreases as an investor becomes experienced. According to their framework, investor’s gain experience by participating in the stock market and thus the level of experience depends both on the amount of time spent on stock market and the intensity of participation.
Barber & Odean (2001) studied investment transactions of 35000 households, between 1991-1997 and published their results in 2001 paper, “Boys will be Boys: Gender, Overconfidence and Common Stock Investment.” They noted that overconfident investors overestimate the precision of their information and thereby the expected gains of trading. They also found that men are overconfident than women and trade more and perform worse than women. The study summarized that overconfidence is a factor that is hazardous to investor’s wealth and concluded that ‘individuals turn over their common stock investments about 70 percent annually.” Mutual Funds also have similar turnover rates

Scott et al (2003), in their study on ‘Overconfidence Bias in International Stock Prices’ found that the speed at which a company is growing seems to be the most important characteristic affecting overconfidence bias. A stock’s growth rate is an important determinant of where to look for evidence of investor overconfidence.

Montier (2006), conducted a study on 300 professional fund managers, and asked them to answer 17 questions to find out how biased they could be. 74 percent of them believed that they had delivered above-average performance and the remaining 26 percent believed that their performance was average. Almost 100 percent of the respondents believed that their performance was average or better. People generally had a tendency to over exaggerate their own abilities.

Ekholm (2006) in his paper ‘How do different types of investors react to new earnings information?’ also suggests that difference in trading behavior are driven by differences in overconfidence, and that investor size is a good measure of overconfidence.

Ekholm & Pasternack (2008) studied the interrelationship between Overconfidence and Investor size and found evidence that investor size affects investor behavior under new information. They documented evidence that investor size
affects investor behavior under new information as larger investors on average react more positively (negatively) to good news (bad ) than small investors. It is also found that the performance of smaller, or more overconfident, investors is in general hurt by their behavior.

2.3 SELF ATTRIBUTION BIAS

Miller & Ross (1975) in a review of the evidence for and against the proposition that self serving biases affect attributions of causality, they provided some support for the contention that individuals engage in self enhancing attributions under conditions of success, but found only minimal evidence to suggest that individuals engage in self protective attributions under conditions of failure.

Dunn (1989) a professor in psychology, in a study undertaken on students, has illustrated that students tend to suffer from self-serving attributional bias. She performed an experiment in which she asks students to take out a sheet of paper and draw a line down the middle of the page. She then tells them to label ‘strengths’ and ‘weakness’ and asks them to list their strengths and weaknesses. She finds that students consistently list more strengths than weakness. The results suggest that students tend to suffer from self serving attributional bias.

Feng Li (2010) studied the relationship between Self Attribution Bias(SAB) and Overconfidence . He examined the association between Self Attribution Bias and the manager’s tendency to issue forward looking statements and provide earnings forecasts. Study found evidence that managers with SAB tend to issue forward looking statements in the MD&A(Management Discussion and Analysis Section), that are more homogeneous in tone and their earnings forecast tend to be overly optimistic. This evidence suggest that managers have self serving attribution bias which leads to overconfidence.
Gervais & Odean (2001) developed a model that describes how novice traders who exhibit susceptibility to self-serving bias end up becoming unjustifiably confident in their investment skills because they tend to take inadequate degrees of responsibility for losses they have incurred. Self attribution teaches investors to unwittingly take an inappropriate degree of financial risk and to trade too aggressively. The study revealed that while the novice investors are consistently overconfident, that they can outperform the market, most fail to do so.

Hsu Yenshan & Shiu Cheng-Yi (2007) analyzed the investment performance of 6993 investors bidding in 77 discriminatory IPO auctions in the Taiwan Market, taking the no. of IPO auctions in which investors placed bids as being representative of their experience. This model on Self Attribution bias predicts that experienced bidders become overconfident due to successful initial bids and are likely to bid again and again leading to inferior performance.

Feng Li (2010) studied the relationship between Self Attribution Bias & Overconfidence, using two settings that reflect managers’ belief about future cash flows. The study revealed that managers have Self Serving Attribution Bias which leads to Overconfidence.

2.4 ILLUSION OF CONTROL

Langer (1975) describes Illusion of Control bias as a tendency in human beings which leads to believing that they can control or atleast influence outcomes when in fact they cannot. It is the expectancy of a personal success probability inappropriately higher than the objective probability would warrant. Langer found that choice, task familiarity, competition and active involvement can all influence confidence and generate such illusions. Ellan langer in a series of experiments to elucidate the phenomenon of illusion of Control demonstrated that people
selecting their lottery ticket asked higher selling prices than people who have been assigned a ticket.

**Davis et al (2000)**, In order to examine the effects of active vs. passive task participation (a variable hypothesized by Langer to affect the illusion of control), patrons of Reno casinos were observed placing craps bets on their own and another yoked patron's dice rolls. It was hypothesized that subjects would (a) place higher bets and (b) place more “difficult” bets (e.g., where only one specific number, as opposed to any of several numbers, may win) on their own rolls (when they would experience the illusion of control over the outcome) than on other patrons' roles (when they would not experience such an illusion). That is, players were expected to generally adopt riskier betting strategies when throwing the dice. Results supported the hypotheses

**Charness & Gneezy (2003)**, in their experimental study investigated common biases like ambiguity aversion, myopic loss aversion and illusion of control in the context of investing in a risky lottery. Their results indicate that although subjects are willing to pay for reducing ambiguity, they actually invest less in the lottery. Furthermore, subjects pay a premium to be able to monitor and change their investments more frequently (in line with myopic loss aversion), but are not willing to pay for exercising more control (i.e., on the winning numbers of the lottery). Thus, illusion of control did not have an influence on investments, which is partly in contrast to the results of other studies.

**Gerlinde (2004)**, in her paper ‘Illusion of Control as a source of Poor Diversification: An Experimental Approach’, investigating factors influencing individual portfolio allocations with particular focus on the role of illusion of control, found that subjects excessively invest in the lottery for which they can determine the outcome by rolling the die themselves indicating that they are prone to illusion of control. However, the effect vanishes with experience.
2.5 LOSS AVERSION

Kahneman & Tversky (1979) developed the Loss Aversion Bias as a part of the original Prospect theory. Loss Aversion is discussed in the context of the S-Shaped utility value function that models the entire evaluation stage in Prospect Theory. Accordingly people weigh all potential gains and losses in relation to some benchmark reference point. They found that the pain people feel from a loss is about as twice as strong as the pleasure felt from an equivalent experience of gain.

Thaler & Johnson (1990) studied how risk aversion is affected by prior gains and losses. They found evidence that people are highly risk averse after prior losses and risk seeking after prior gains.

Benartzi & Thaler (1995) have also found that myopic loss averse investors do not want to invest in stocks even in the face of substantial equity premium. Also shorter evaluation period makes stocks less attractive to a loss averse investor.

Thaler & Schwartz (1997) on explaining the effect of Myopia and loss Aversion on Risk taking, have demonstrated that loss averse investors have greater sensitivity to losses than to gains which is compounded by the frequent evaluation of outcomes. The frequent evaluation of a portfolio performance can lead to shifts in an investor’s long term asset allocation mix. This increases the likelihood of seeing a loss which produces more mental agony than comparable gains satisfy.

Benartzi & Thaler (1999) conducted experiments in the context of retirement savings decision to study repeated investment decisions overtime. The study found that when investors are loss averse, they are willing to take more risk if they evaluate their performance infrequently.

2.6 HERDING
Eagly & Carli (1981) in their study on whether men and women differ in how easily they are influenced were examined meta-analytically. The analysis indicated that women are more persuasive and more conforming than men. They have found that females are more prone to herding behavior than male as women are less confident.

Prendergast & Stole (1996) in their paper titled ‘Impetuous Youngsters and Jaded Old-Timers: Acquiring a Reputation for Learning’, examines individual decision making when decisions reflect on people’s ability to learn. They addressed the problem in the context of a manager making investment decisions on a project overtime. Managers, in an effort to appear as fast learners exaggerate their own information, but ultimately he becomes too conservative being unwilling to change his investment, on the basis of new information, suggesting herding decreases with experience.

Avery & Chavelier (1999) developed a model of managerial decision making when managers have private information about their abilities. Study found that younger decision makers herd more than their older counterparts i.e. more experience leads to less herding.

Suto & Toshino (2004), in a study on the Behaviour of Japanese Institutional Investors, reveals a short term bias in fund managers investment time horizon, they exhibit herding behavior because they follow the trend and use the same published information. Also the institutional investors in general and trust banks in particular have a risk aversion bias.

Menkhoff et.al (2006) in their studies found that people without college degree are more apt to herding. In their survey of 117 German fund managers and analyzing their risk behavior, found that investors with higher degree of overconfidence are less herding. Herding also decreases with experience.
Krishnan et.al., (2006) in their paper ‘Analysts’ herding Propensity: Theory and Evidence from Earnings Forecasts’, have modeled and estimated the analysts herding propensity. The study finds that the herding propensity is positively related to forecast horizon and analyst coverage, but negatively related to analysts’ general experience and brokerage size. About 75 percent of the analyst in the study tend to herd. The findings of the study is an evidence that inexperienced analyst tend to herd more than experienced analyst.

The above review shows that there has been significant studies proving the existence of bias among investors. From the review it was found that most of the studies have been performed on students, followed by studies on investors’ in stock markets and focused more on developed economies. Also most studies do talk of the influence of demographic variables on investor biases, but with contradictory findings. It is also found that no study has been devoted exclusively in bringing out the role of biases and heuristics on the Retail Investor of the Indian Mutual Fund Industry. So this study is an attempt to focus on this segment and explore the influence of selected five bias on the investors and answers the following research questions

1. What is the role of the above mentioned bias on investor’s decision making? / Are the mutual fund investors influenced by the above selected five biases?
2. Do demographic factors have an influence on the investor bias? If so, how significant is their influence?
3. Is there a relationship between the investor biases taken up for the study? If so how significant is their relationship?
4. Does one bias lead to the other?