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BEHAVIORAL FINANCE: INVESTOR PSYCHOLOGY

Doktora Tezi

KADİR CAN YALÇIN

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Danışman: DOÇ. DR. JALE SÖZER ORAN

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Marmara Üniversitesi
Sosyal Bilimler Enstitüsü Müdürlüğü

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ÖZET

DAVRANIŞSAL FİNANS: YATIRIMCI PSİKOLOJİSİ

Finans kararlarının davranışsal ve psikolojik sonuçları ile ilgilenen davranışsal finans, finansın çok disiplinli bir alt dalıdır. Her ne kadar insan davranışlarını etkileyen psikolojik ve sosyolojik olaylar davranış bilimleri açısından yaygın bir şekilde tartışılıyor ise de, bunun etkileri finans alanında nispeten yenidir. Bu tezin ana amacı davranışsal finans açısından bireysel yatırımcıların finansal kararları nasıl aldıklarını ve nasıl davrandıklarını ortaya koymaktır.

Tezde, ilk olarak beklenen fayda teorisi ile beklentiler teorisi karşılaştırılmıştır. İkinci olarak etkin piyasalar teorisi ve piyasa anomalileri verilmiştir. Üçüncü olarak, rasyonel davranışlardan sapmaların sebebini teorik anlamda anlama adına insan davranışlarını ve kararlarını etkileyen ortak hatalar (etkiler) verilmiştir. Son olarak da bireysel yatırımcıların yatırım yaparken sergilemiş oldukları irrasyonel davranışlar ile ilgili anket bazlı çalışma yapılmıştır.

Araştırma yatırımcıların cevaplarının ortak davranışsal hatalarla ne kadar ilgili olduklarını bulmaya çalışan ilk girişimdir.

Test sonuçlarına göre, kendini aldatma altında sınıflandırılan hatalar yatırımcılar üzerinde daha güçlü bir etkiye sahiptirler ve bu nedenle yatırımcılar kendi bilişsel yetersizliklerinden zarar görürürler.

Cinsiyet ve ortak davranışsal hatalar ilişkisi bağlamında erkeklerin kadınlara göre daha çok hataya sahip olma eğiliminde oldukları gözlemlenmiştir. Erkekler daha çok kendine güvenli, statükocu, aşırı iyimser, ruh hallerinden daha çok etkilenme eğiliminde olan, kontrol ve bilgi yanılsamasına daha çok maruz kalan, öngörü yanılgısı daha çok olan, daha çok taklit ve sürü davranışında bulunma eğiliminde olan taraftır.

Eğitim seviyesi ile ortak davranışsal hataların ilişkisi söz konusu olduğunda da, zihinsel muhasebe, temsil edilebilirlik kısayolu, bilişsel çelişki ve kendini onaylatma hataları eğitim seviyesi yükseldikçe yükselme eğilimindedir. Öte taraftan, kontrol yanılsaması ve belirsizlikten kaçma hataları da eğitim seviyesi ile ters korelasyonludur.

GENERAL KNOWLEDGE

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ABSTRACT

BEHAVIORAL FINANCE: INVESTOR PSYCHOLOGY

Behavioral finance is a multidisciplinary subfield of finance dealing with behavioral / psychological implications of financial decision making. Even though the psychological and sociological phenomena that affect human behavior are widely discussed in terms of behavioral science, their impact is relatively new in the area of finance. This thesis' main objective is to discover how individual investors behave and make financial decisions from the behavioral finance point of view.

In the thesis, first, expected utility theory and prospect theory are compared. Second, efficient market hypothesis and market anomalies are given. Third, common behavioral biases which affect human behaviors and decisions are provided in order to grasp the theoretical explanations to the reasons of the deviations from the rational behaviors. Lastly, survey-based study about the irrationality of individual investors when trading is exhibited. The research is the first attempt to find out how the investors' answers are related with the common behavioral biases.

According to the test results, biases categorized under self deception have stronger impacts and therefore investors are suffering from their cognitive disabilities.

Males tend to have more biases than females in terms of gender and common behavioral biases relationship. Men are more overconfident, conservative, over-optimistic and moody, have more illusion of control, illusion of knowledge and suffer more from hindsight bias, demonstrate more imitative and herd behavior.

Mental accounting, representativeness, cognitive dissonance and confirmation biases tend to increase as education level increases; on the other hand, illusion of control and ambiguity aversion have negative correlation with education when the relationship between education level and common cognitive biases is concerned.

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İstanbul, 2009 Kadir Can Yalçın

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LIST OF ABBREVIATIONS

DJIA	Dow Jones Industrial Average
E/P	Earnings-Price Ratio
IPO	Initial Public Offerings
ISE	Istanbul Stock Exchange
NYSE	New York Stock Exchange
P/B	Price-to-Book Ratio
P/E	Price-Earnings
SAC	Salience, Availability, Cue Competition
S&P	Standard and Poor’s
T-Bills	Treasury Bills
US	United States

1. INTRODUCTION

Behavioral finance is a finance discipline interacting with the psychology and sociology which has emerged in order to obtain a better explanation about how psychological factors affect investors' behaviors and decisions. Traditional finance ignores to examine the behavior and psychology dimension in financial decisions of individuals (Shiller, 2003; Elvin, 2004; Bodie et al., 2007).

There are two main premises of traditional finance theory. First one is human behavior is rational during the decision making process described by the expected utility theory and the second, financial markets are efficient in the sense to reflect the correct prices supporting the efficient market hypothesis. Behavioral finance argues about these two premises, incorporating the prospect theory and the observed anomalies in financial markets.

The expected utility theory briefly presumes individuals who always try to maximize their utilities by setting limits to their feelings and act only by using their minds as super-calculator, emotionless robots. However, this kind of rationality is hypothetical and in reality, individuals suffer some cognitive limitations when they have to make decisions. Furthermore, many academicians exhibited counter evidence against the validity of this type of rationality including Allais (1953), Simon (1955), and Ellsberg (1961). However, until Kahneman and Tversky (1979)'s prospect theory, no one achieved to develop an alternative theory that can be accepted as a theory which is eligible to describe what the actual behavior is without ignoring the psychological and behavioral dimensions of individuals' choices. Kahneman and Tversky (1979) demonstrated evidences, showing that individuals do not always choose the alternative that will maximize their utilities; that is, they are risk-averse with respect to gains; however, risk-seeker with respect to losses. Moreover, the presentation of the decision problem could lead a deviation from the rational behavior (Kahneman et al., 1979, pp. 273). Simply, people are "rational" in standard (traditional) finance; they are "normal" in behavioral finance (Statman, 1999, pp. 26).

The efficient market hypothesis has three basic assumptions. First, investors are rational. That is, they value the securities with respect to their

fundamental value. Second, some investors may be irrational; however, their investing activities are in the random fashion and uncorrelated; therefore, their trading cancelling each other without affecting the price. Third, if they are highly correlated with each other, which means if they do not cancel their irrational activities out, this time some professional arbitragers eliminate their activities (Shleifer, 2000). To sum up, the efficient market hypothesis does not assume that all investors are rational, but it does assume that markets are rational (Ritter, 2003, pp.2). However, many researchers including DeBondt and Thaler (1985), Black (1986), De Long et al. (1990), Shleifer and Vishny (1995), Thaler (1987, 1999a), etc. exhibited many observed market movements that are not explained by the arguments of the efficient market hypothesis, called anomalies.

Even though, there is a common ground, conventional and behavioral finance have different views in order to explain the reasons for market anomalies. The proponents of traditional finance leading by Fama and French (1998) claimed that, because the necessity of the usage of asset pricing theories in order to test the market efficiency, the arising problems (anomalies) are because of the asset pricing theories or all these can be explained by chance. On the other hand, behavioral finance tries to explain them by behavioral biases. Biases are people's systematic errors of judgments when he or she makes a decision on something (Kahneman et al., 1998, pp. 2). Tversky and Kahneman (1973, 1974, 1981, 1986), Kahneman and Tversky (1973, 1979), Kahneman and Riepe (1998) Hirshleifer (2001), Montier (2002), Nofsinger (2005), Barber and Odean (2001), Barberis et al., (1998), etc. exhibited how behavioral biases affect human decision.

This thesis' main objective is to discover how individual investors behave and make financial decisions and it consists of six sections. In the introduction section we give an overall view of behavioral finance with discussing its main objections to traditional finance. In the second section, expected utility theory and prospect theory will be given in order examine the question "are we rational or not". In the third section, efficient market theory and market anomalies will be explained in order to answer the question "are markets rational or not". In the fourth section, common behavioral biases which affect human behaviors and decisions will be given

with possible implications to the investors. In the fifth section, survey-based research about the irrationality of individual investors using behavioral approach will be given in order to examine the possible psychological factors which affect the investment decisions of individual investors in Turkey. Finally, in the conclusion part, the findings are summarized and some remarks for further research are presented.

2. EXPECTED UTILITY THEORY VERSUS PROSPECT THEORY

2.1. EXPECTED UTILITY THEORY

Uncertainty is present in almost all decisions concerning both social and business life, but financial decisions constitute a special case. Yet, one is expected to make healthy decisions when faced with uncertainty, because our decisions will designate how much pleasure and enjoyment will be attained in life. In economic terms, pleasure and enjoyment are defined as a *utility* (Barak, 2008). In other words, utility consists of pleasure and prevented pain (Abaan, 2002, pp. 46). However, it is quite difficult to measure utility in economical terms.

Daniel Bernoulli developed for the first time, an "Expected Utility Theory" in 1738; subsequently, it was formulated by John von Neumann and Oscar Morgenstern in 1944 (Taşdemir, 2007). This model is widely accepted today as a formulated way of explaining rational human behavior under uncertainty by using a measurable utility function. The basic logic behind the expected utility theory is *rationality*. Kahneman and Smith (2002, pp. 11) described the term rationality as follows "*rationality means that decision-maker use available information in a logical and systematic way, so as to make optimal choices given the alternatives at hand and the objective to be reached"*

The theory always expects rational behaviors from human beings no matter what the circumstances are. That is, economic actors are rational creatures who always try to maximize their expected utilities in three stages. In the first stage, they calculate the possibility of the occurrence of the alternatives which they face. Then, they multiply these possibilities with the offered gains of the alternatives. In the last stage, they choose the maximum amount because they always try to maximize the gains and minimize the losses. Simply, they decide what to do by maximizing the probability-weighted average.

To illustrate this notion consider the following example. Suppose there are two options that we have to choose from. In option *A*, with 30% probability we earn 500 $ and in option *B*, with 35% probability we earn 450$. Under the rationality assumption of expected utility theory we have to choose option B. Because when we evaluate option *A*, we find a final value of 150 (0.30*500) where as option *B*'s final value is 157.5 (0.35*450) and 157.5 is bigger than 150. The same process applies to losses. For example when we face a choice between option *C* which offered 10% probability of losing 100$ and option *D* which offered 30% probability of losing 40$, we certainly have to choose option C. Because if we choose option *C*, the final amount that we lose will be 10$ where as it will be 12$ in option *D*. If we are rational creatures as expected utility theory says, it is better to lose 10$ rather than 12$.

Thus, expected utility is defined as the final value which is found by the multiplication of the each possible utility resulting from a decision and events likely to happen. Here, it is assumed that there is a utility function (*u*) which is the result of the every individual's obtaining (*x*) from their decisions. Such that if one available action (*a)* result in probabilities (*p)* over the outcome (*x)*, another available action (*b)* results in probabilities (*q)* over the same outcomes; simply if $p*U(x) > q*U(x)$ then the individual must choose action (*a)* because its utility is greater than that of action (*b)* (Kahneman et al., 2002, pp. 11).

On the other hand, there are some attempts to present alternative views against expected utility and its "rationality". Nobel laureate Herbert Simon (1955) used the term *economic man*, which he also referred to as an *administrative man*, needs to be revised. Because economic man (homo economicus) refers to an individual who always tries to maximize his utility by setting limits to his feelings and acts only by using his mind. This definition of economic man is hypothetic; and in reality, when he makes decisions, an individual suffers some cognitive limitations because of limited computational skills and memory capacities. Moreover, individuals do not always try to reach the best alternative (maximize the utility), and often finds the "good enough" satisfying. Simon labeled the departures from rational behavior to irrationality as *intendedly rational* and *approximate rationality* (Simon, 1955). These notions are known as *bounded rationality*.

Maurice Allais (1953) and Daniel Ellsberg (1961) are two who presented counter evidences against expected utility. Consider this paradox. Why do individuals prefer a certain 3.000$ (100% probability) gain instead of 4.000$ gain with 80% probability? It is clear that according to the expected utility theory the second option's utility (4000*0.80=3200) is greater than the first one (3000*1=3000); however, 80% of the participants chose the first one; on the other hand, they behave as rational creatures consistent with the expected utility by choosing 4.000$ with 20% probability (65% of them chose this option) than 3.000$ with 25% probability (4.000*0.20=800 > 750= 3.000*0.25). Kahneman and Tversky (1979) called this tendency to choose certain gains as *certainty effect*.

Allais, Simon, Ellsberg and other academicians' researches gave rise to views against the notion of "unlimited rationality" and "maximization of utilities under every circumstance". However, despite the great criticism against expected utility theory, they did not offer a new substitute model that can describe human behavior satisfactorily until Kahneman and Tversky (1979).

2.2. PROSPECT THEORY

Standard (traditional) finance theory is based on expected utility theory and, while it was widely accepted among academicians, in 1979 famous American psychologists Daniel Kahneman and Amos Tversky presented a critique of expected utility theory and developed an alternative model in order to explain human behavior under uncertainty. It has since seemed as an anchor for behavioral finance supporters. Kahneman and Tversky (1979) demonstrated some evidences that individuals do not always choose the alternative that will maximize their utilities. In fact, the presentation of the decision problem could lead to a deviation from rational behavior. Consider these typical examples (Kahneman et al., 1979, pp. 273).

In addition to whatever you own, you have been given 1,000$. You are now asked to choose between;

A: 50% chance to win 1000$

B: 100% chance to win 500$

As a matter of fact both option's overall utility are equal to each other (50%*1000 = 100%*500). However only 16% of the participants chose option *A* and 84% of them chose option *B*. The respondents chose the sure gain and avoided the risk of winning nothing in spite of the equal possibility of winning the maximum amount. On the other hand, *risk-averse* behavior tends to continue even if the question format is changed. To test this, a further question is asked.

In addition to whatever you own, you have been given 2,000$. Now choose between;

C: 50% chance to lose 1000$

D: 100% chance to lose 500$

If the same risk-averse behavior continues, the participants ought to choose option *D*. However, only 31% of them chose option *D*, where as 69% chose option *C*. By evaluating the responses to these questions, it is concluded that individuals are risk-averse with respect to gains which is consistent with expected utility theory; however, they are *risk-seeker* with respect to losses which is against the invariance feature of the expected utility theory; i.e. the decisions should not be affected by the presentation of the alternatives. The violation of this feature is also exhibited in a non-monetary question by Tversky and Kahneman (1986, pp. 260) as follows;

It is estimated that 600 people will die because of the disease in Asia. Choose one of the two alternative programs proposed to combat the disease.

Program A: 200 people will be saved for sure.

Program B: There is 1/3 probability that 600 people will be saved, and 2/3 probability that no one will be saved.

72% of 152 of undergraduate students of Stanford and British Colombia Universities chose program *A*, while 28% chose program *B*. Same question is asked and program *A* and program *B* is given in another way.

Program C: 400 people will die for sure.

Program D: There is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.

This time, only 22 % of the participants selected program *C* which is exactly the same of program *A*. 200 people will be saved out of 600 means that 400 people will die for sure. Same shift is seen in program *D*. Even though it is

exactly the same as program *B*, this time 78% of the participants selected program *D*.

The presentation of the alternatives is the reason for these dramatic shifts from one program to another despite both are the same. That is, the participants chose program A because they evaluate "living" as a positive term or gain and they behave as a risk averse. On the other hand, they chose program D because they evaluate "dying" as negative term or loss and select the *risk-acceptance* behavior. Kahneman and Tversky (1979) called this shift a *reflection effect*.

The utility function in the expected utility theory transformed to the *value function* (figure 2.1) in the prospect theory.

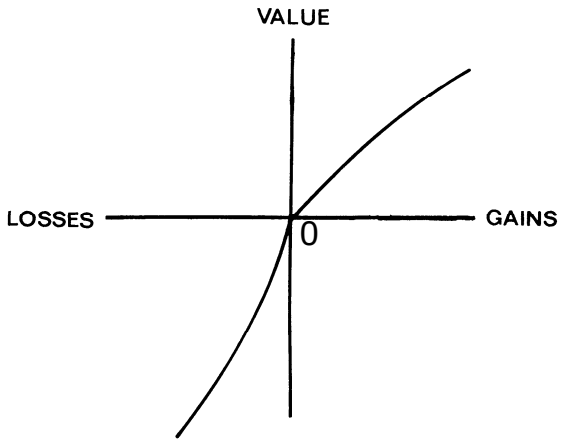

Figure 2.1- Value Function (Kahneman et al., 1979)

As seen in figure 2.1, "value" is used instead of "utility". The zero-point is called *reference point*; that is, in order to assess the outcomes, people use the deviation from it rather than use net asset levels (Levy, 1992). This reference point often is the beginning of the wealth, but sometimes it can be an ultimate point that the decision maker wants to reach. Gains and losses are evaluated with respect to this reference point (Bostancı, 2003). The area above the reference point through gains is *concave* and it is *convex* for losses. It tells us that people tend be to risk-averse when facing alternatives containing gains and they have a tendency to accept the risk (risk-seeker) when losses are concerned (Kahneman et al., 1979). Furthermore, it has a kink at zero, being steeper for small losses compared to small gains. The function *u* in expected utility theory, by contrast, is

usually taken to be smooth and concave everywhere (Kahneman, 2002, pp. 17-18). Moreover, people feel doubled pain when they lose compared to feeling pleasure when they win. Thus they become *loss averse* (Tversky and Kahneman, 1992). Loss aversion leads people to segregate each investment in terms of gains and losses causing *mental accounting*. In fact, prospect theory is considered an outcome of *heuristic* (shortcut) simplification (Nofsinger, 2005, pp.7).

According to Kahneman and Tversky (1979), prospect theory consists of two phases. First one is the *editing phase* which involves initial analysis of the problem. Second one is the *evaluation phase*. The more important and dangerous phase is the editing phase, because it involves several mental operations such as coding, combination, segregation, cancellation, simplification and detection in order to organize and reformulate the options for the simplification of the choice problem. Consequently, with the help of these mental operations, evaluation task become easy. However, many anomalies of choices arise in the editing phase (Kahneman et al., 1979; Tversky et al., 1981; Levy, 1994; Liu, 1998). According to the prospect theory, in the evaluation phase, the following equation is used under uncertainty (Kahneman et al., 2002).

$$\pi(p).V(\Delta w)$$

where $\pi(\ )$ denotes the decision weights, $V(\ )$ denotes to the value function and Δw denotes the final changes in wealth which is the deviation from the reference point.

A probability (p) in the expected utility theory is replaced by decision weight $[\pi(p)]$ in the prospect theory.

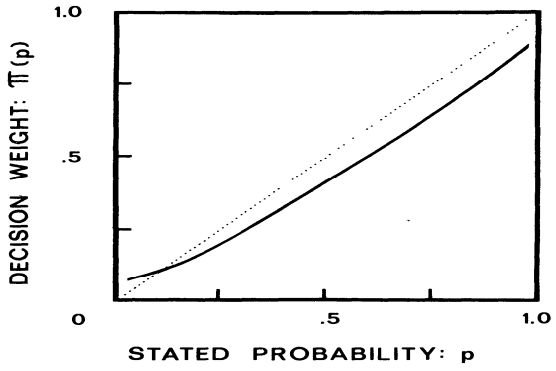

Figure 2.2- A hypothetical weighting function (Kahneman et al., 1979)

The decision weight function is monotonically increasing, with discontinuities at 0 and 1, such that it systematically overweighs small probabilities and underweighs large probabilities. This can explain the Allais paradox (Kahneman et al., 2002, pp.18). In other words, individuals clump intermediate probabilities in their minds, making the difference between 45 and 55 percent much less noticeable than that between zero and two percent or 98 and 100 percent (Schneider, 2007, pp. 25). The dotted line in the figure 2.2 represents the objective probabilities in the expected utility theory and the concave line exhibits how people transform the objective probabilities while deciding (Bostancı, 2003).

As a result, expected utility theory was developed from a set of logical axioms and tries to describe what rational behavior has to be, on the other hand prospect theory is developed from the empirical observations and tries to describe what the actual behaviors are, but both are required (Kahneman, et al., 2002; Tversky et al., 1986).

Expected utility theory and prospect theory actually deal with the same thing: decision making by individuals. Although two theories' suggestions are different, there is still some common ground and it seems like the former (normative) explanations are less powerful than the latter (descriptive) ones.

3. EFFICIENT MARKET HYPOTHESIS AND MARKET ANOMALIES

3.1. EFFICIENT MARKET HYPOTHESIS

We first see the concept of *market efficiency* by Louis Bachelier in 1900. He worked on stock and commodity prices in order to find out if they fluctuated randomly or not. In 1905 Karl Pearson introduced *random-walk*, also known as the *drunkard-walk* concept (Dimson et al., 1998, pp. 91-92). Cowles (1933) presented the results of analysis of the forecasting efforts of some professional agencies including insurance companies, investment professionals and financial publications which have attempted to predict which specific securities would be most profitable and the future movements of the stock market itself. He found that these professional agencies have no obvious skills to beat the market. Subsequently, Cowles (1944) continued his research on stock market forecasting and did a similar study, but this time extended the sample period. In his later study, he found that the record of the forecasting agency with the best result is only 3.3% better than the forty years average of the stock market return. Kendall (1953) who for the first time used the term random-walk in finance literature, examined 22 British stock indexes and American commodity prices in order to find out regular price cycles, but prices seemed to follow a random-walk; they may to go up or go down on any particular day, regardless of what had occurred on the previous day. Roberts (1959) found similar results with American data for both indexes and individual companies and verified that changes in the Dow Jones Index seem to be generated from a cumulated random number. Osborne (1959) demonstrated that US stock prices seemingly random movements just like the molecule particles.

Fama (1965a) discussed some empirical evidence supporting random-walk theory in his doctoral dissertation. Later, he (1965b) presented a condensed, non-technical version of his PhD Thesis at the 1965 Management Conference in University of Chicago. Fama (1965b) uphold random-walk theory as an accurate description of reality. He then, challenged proponents of *technical* and *fundamental* analysts, be they

professionals or academicians, in order to prove their arguments that the future path of the price level of an individual security or the stock market can be predictable, by doing a technical or fundamental analysis. At that time (probably even now) the technical or fundamental analysis were commonly used and supported methods predicting the stock prices by the market professionals.

Fama positioned random-walk theory which has appeared in academic journals, but has not been appreciated in later years, against the technical and fundamental analysis which is too complicated for the non-mathematicians. As he declares, the logic behind the technical (chartist) theories is that history tends to repeat itself. That is, if we look at the past behavior of an individual security or a stock market itself, we can foresee their future path by analyzing past sequence of price changes. According to him, it is impossible to gain abnormal profit by looking at the history of the series price changes because successive price changes are independent (chartist theories says dependent) exactly what random walk theory says. Moreover, he thought that the market professionals rely on the fundamental analysis rather than technical because the technical analysis has not a secure basis. The assumption of the fundamental analysis approach depends on security has an intrinsic value other than actual price. Intrinsic value is the value of security's potential earnings. Some fundamental factors such as quality of management, the overall situation in industry in which the firm is and the economic condition itself can affect a security's potential earnings. Therefore, an analyst can predict the future price of a security by evaluating these fundamental factors by finding out the intrinsic value and comparing it with the security's actual price. If actual price of security is lower than its intrinsic value, sooner or later the actual price will go up through its intrinsic value and vice versa. Against the logic behind the opponents of fundamental analysis and Fama (1965b, pp.3-4), for the first time in literature, defined an *efficient market* as:

"a market where there are large numbers of rational profit maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants".

This definition implies that a multiple of rational participants who compete with one another lead to the elimination of discrepancies between the actual prices and intrinsic values even though the latter are hard to estimate. The neutralization process of discrepancies between the actual price and the intrinsic values will cause the remainder of the uncertainty and the actual price fluctuates randomly around its intrinsic values. The actual or expected new information can change the intrinsic value. According to Fama, in this situation, the actual prices will immediately changed by absorbing the new information and try to find the new level of intrinsic value because of high competition between many intelligent participants. Around the same time, Samuelson (1965, pp.41) demonstrated that the series of successive price changes are independent by claiming that:

"In a competitive market there is a buyer for every seller and if somebody is sure that a price would rise, it would have already risen"

He inferred that the unpredictability of prices show the sign of efficient working of the stock markets.

Fama (1970) presented a landmark paper on the efficient market which focused on a comprehensive review of the theory and beyond the theory to empirical work. He defines market efficiency very clearly (Fama, 1970, pp. 383):

"A market in which prices always fully reflect all available information is called efficient."

According to the definition of the efficient market hypothesis, an efficient market can exist if the following events occur (Jones, 1993, pp. 626; Shleifer, 2000, pp. 2):

i. A large number of rational profit maximizing investors exists who actively participate in the market, hence value securities rationally.
ii. If some investors are not rational, their irrational trades are canceling each other out or rational arbitrageurs eliminate their influence without affecting prices.
iii. Information is costless and widely available to market participants at approximately same time. Investors react quickly and fully to the new information, causing stock prices to adjust accordingly.

3.1.1. The Forms of the Market Efficiency

In the definition of the "relevant information set" that prices should reflect, Fama distinguished three nested information sets: past prices, publicly-available information, and all information including private information (Kondak, 1997, pp. 36). Efficient market hypothesis is divided into three stages as the weak-form, semi-strong form, and the strong form with respect to the availability of the above mentioned three information sets.

Weak-form of efficiency claims that the current stock prices already reflect all historical market data such as the past prices and trading volumes (Bodie et al., 2007). The assertion of weak-form of efficiency is very much consistent with the findings of researches on random walk hypothesis; that is, the price changes from one time to another are independent (Dixon et al., 1992). In other words, one can not make a superior profit by only examining the historical prices information. Therefore, the technical (trend) analysis which is a technique using the derivation of past price movements in order to find out a meaningful sign to predict the future path of an individual stock or stock market itself is useless (Jones, 1993). However, one can beat the market and make superior profits in the weak-form of efficient market by using the fundamental analysis or by insider trading.

Semi-strong form of efficiency states that, in addition to the past prices, all publicly available information including fundamental data on the firm's product line, earnings forecasts, dividends, stock split announcements, quality of management, balance sheet composition, patents held, accounting practices, etc., should be fully reflected in security prices. Thus, one can not make a superior profit by using the fundamental analysis in the market which is efficient in the semi-strong form. It is obvious that technical analysis can not work at the semi-strong form of efficient market because, if a market is efficient in the semi-strong form, it is also efficient in the weak-form, because past prices are also publicly available information (Dixon et al., 1992; Bodie et al., 2007). However, insider traders can make superior profits in semi-strong form of efficiency.

Strong form of efficiency states that market prices reflect all information including both the past prices and the all publicly available information, and plus all other private information. In such a market, prices would always be fair and no investor, even insider traders, can not beat the market (Brealey

et al., 1999). Again, none of the technical and/or fundamental analysts can beat the market to make an abnormal return in strong form of efficiency because, if a market is efficient in the strong-form, it must be efficient in both the weak-form and the semi-strong form. Thus, the techniques that do not work in the weak-form and the semi-strong efficiency markets naturally can not work in strong form efficiency markets. Figure 3-1 exhibits the three nested information sets and the types of market efficiency

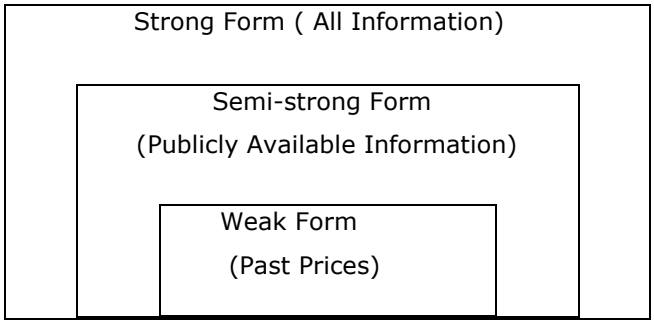

Figure 3.1: Cumulative levels of market efficiency and the information associated with each level (Jones, 1993, pp. 628)

3.1.2. Market Efficiency and the Arbitrage

The efficient market hypothesis has *three* basic assumptions. *First*, investors are rational; that is, they value the securities with respect to their fundamental value. As discussed at the previous section, when investors learn something about a security, they immediately reflect this knowledge to the price of that security. *Second*, some investors may be irrational; however, their investing activities are in the random fashion and uncorrelated; therefore, their trading cancels each other without affecting the price. The logic behind this assumption is that investors' trading activities are poorly correlated with each other. *Third*, if they are highly correlated with each other, which means if they do not cancel their irrational activities out, this time some professional *arbitragers* eliminate their activities, and make profits. In short, efficient market hypothesis says that the current prices of securities are close to their fundamental values because of either the rational investors or the arbitragers' buy and sell action of under or overpriced stocks (Shleifer, 2000). However, some empirical evidence tells a different story. Black (1986) called the irrational

investment activities as a *noise*, because investors value the securities on a noise rather than by using the information about the securities. Moreover, according to De Long et al. (1990), the beliefs of irrational investors' affect the securities' prices and more importantly create a risk which causes to block the willingness of arbitragers to position against the irrational investors in order to gain a profit which they called a *noise trader risk*.

The logic behind the noise trader risk is the unpredictability of noise traders' future opinions. An arbitrager will give up or be afraid of an arbitrage, because of the possibility of a noise traders' continuation of irrational investing activities. That is, an arbitrager who buys an underpriced security relative to its fundamental value has not ignored the possibility of the continuation of the noise trader pessimism in the near future. Otherwise, when they need to sell the security in order to liquidate the investment they will face an unexpected loss. This situation is valid for securities which are overpriced relative to their fundamental values. An arbitrager who sells an overpriced security in short thinks it will soon lose its value and he or she can buy it at the low value relative to its selling price after the process of losing the value. However, again, an arbitrager must be aware of the possibility of noise trader optimism continuing in the near future (De Long et al., 1990).

Moreover, besides the risk that mispricing becomes more extreme by the noise trader, there is another limitation against an arbitrage. That is, who makes the arbitrage? Fama (1965) viewed the arbitrage as an activity which involves a large number of investors taking small position against mispricing. According to Shleifer and Vishny (1995), it is an activity which is done by relatively few and highly informed professional investors who use the resources of outside investors to take a large position. If this view is true, then an arbitrager has to attract outside funds in order to make an arbitrage in a market because the greater deviation from the fundamental value needs greater funds for an arbitrage activity. However, usually investors are not well informed about markets and only few of them can distinguish a good arbitrager from the bad one and they evaluate the performance of the arbitrager with respect to his or her past track records. Therefore, investors supply limited resources to the arbitrager and increase or decrease the limits or even withdraw the funds causing the arbitrage

position to shut down before it gains the profit. As a result, despite the greater mispricing of securities' from their fundamental values gives a chance to gain a superior profit for an arbitrager and brings prices close to their fundamental values, arbitragers avoid a such activity (Shleifer et al., 1995).

3.2. THE MARKET ANOMALIES

There are many observed market movements that are not explained by the arguments of the efficient market hypothesis. In the standard finance theory, such market movements that are inconsistent with the efficient market hypothesis are called *anomalies* (Bostancı, 2003). According to Tversky and Kahneman (1986, pp.252) *"an anomaly is a deviation from the presently accepted paradigms that is too widespread to be ignored, too systematic to be dismissed as random error, and too fundamental to be accommodated by relaxing the normative system".*

The most commonly seen anomalies are (Thaler, 1999a, pp 13-14):

i. Volume
ii. Volatility
iii. Cash Dividends
iv. The Equity Premium Puzzle
v. Predictability

Volume: If the investors are rational as stated in the expected utility theory and the efficient market hypothesis, they do not trade too much except when they need liquidity and the desire to re-shape their portfolios. We expect too little investing activities by only using the publicly available information from the rational investors; however, we can see millions of buying and selling orders in stock markets even when no apparent reasons exist. How can we explain the exchange of the 700 millions IBM shares in a day when approximately 5-6 billions volume of both buying and selling is seen in a normal day in NYSE where around 3600 stocks are listed? Which information is used by the seller and why does not the buyer have that information if they invest by using all the available information? (Bostancı, 2003; Oran, 2008; Thaler, 1999a)

Volatility: In the standard finance theory, the value of a stock is found by discounting the expected future dividends to present. From the efficient market point of view, the price of a security changes only when there are dividend expectation or when new information has arrived. However, there are too many cases of excess volatility observed in stock markets that could not explained by market efficiency perspectives (Oran, 2008). LeRoy and Porter (1981), Shiller (1981) studied S&P 500 Index, DJIA and some *blue chips* stocks and showed that the volatility in securities is five to thirteen times as high as the changes in present value of future dividends.

Cash Dividends: According to Black (1986), dividend policy is a tool through which managers can communicate with company's shareholders especially for the things that they do not say sharply and quickly. Therefore, it has been always an important indicator for the determination of market price. The commonly used dividend policies are cash-dividend, stock-dividend, stock-splits and stock-repurchase plans (Brealey et al., 1999). According to Miller and Modigliani (1961), dividend policy is irrelevant in determining the value of the company and its stock price under the no tax world assumption. Unfortunately, we do not have this kind of "perfect world"; on the contrary, tax concerns always exist. At this point, the cash-dividend anomaly occurs. That is, if the company wants to give stock to its shareholders as dividends and if the shareholders want to realize their gains by selling the stock, then it is subject to capital gain. It is valid both for the stock-splits and stock-repurchases by the company. Moreover, capital gains are subject to tax only when realization happens. However, in most countries, cash dividends are subject to income tax which is higher than capital gain. Nonetheless, cash dividends are more preferable than others despite higher tax disadvantage (Miller, 1986). Moreover, when the company announces a cash dividend program, its stock price rises (Long, 1978). While, whether the reason for this is market inefficiency is highly controversial, it remains as an anomaly and needs to be answered (Thaler, 1999a).

The Equity Premium Puzzle: Mehra and Prescott (1985) for the first time compared the historical returns of stocks and Treasury Bills (T-Bills) in the

United States using relevant data dating back to 1926. Later, it was updated by Mehra (2003), from extending the historical data from 1889 to 2000, and including data from the United Kingdom, Japan, Germany, and France. In the United States, the average yearly return of the market index was 7.9% after inflation adjustment, where as the T-Bills' average yearly real return was only 1% between the years 1889 and 2000. This means that in every year for about period of 110 years, about 6.9% equity premium has occurred in the USA. The premium between the market index and the relatively riskless security is so dramatic in the period between 1926 and 2000. The mean real return of market index was 8.7% where the inflation adjusted rate of return of T-bill was only 0.7%. It simply means that if you invest 1$ in the market in 1926, it becomes nominally 2,586.52$ and 266.47$ after the inflation adjustment in 2000. On the other hand, if you invest in T-Bills rather than market index in the USA, your 1$ becomes 16.56$ and only 1.71$ real value in 2000. Furthermore, we can see same type equity premium in England, Japan, Germany and France where the average inflation adjusted premium between market index and these countries' government bonds varies from 6.6% to 4.6%.

To sum up, we have a clear picture as shown in real data that stocks outperformed bonds with a high margin what Mehra and Prescott (1985) called "the equity premium puzzle". In such a case, why do not people invest all their savings in stocks rather than holding bonds? Benartzi and Thaler (1995), explained this puzzle-anomaly with the notion of *myopic loss aversion* and the *mental accounting* which are the factors affecting the investor's psychology.

Predictability: According to efficient market theory, it is impossible to predict the future path of the security prices by using the available information in the market. However, there are numerous types of empirical evidence suggesting that it can be possible to predict future prices by using, for example, dividend yields, earnings-price ratio, price-to-book ratios, earnings announcements, size of the company, share repurchases, initial public offerings, etc. (Thaler, 1999a).

Rozeff (1984), Fama and French (1988) used dividend yields (D/P) and found out meaningful clues to predict the future returns of stocks; that is, if the yield is high, then the stock return will be high.

Campbell and Shiller (1988) used earnings-price ratio (E/P) and found E/P ratio is a powerful tool for the prediction of stock return especially when the past earnings averaged over 10 years.

Basu (1977) used price-earnings (P/E) and found that stocks that have low P/E ratio tend to outperform over the stocks that have a relatively high P/E ratio relatively.

Lakonishok, Shleifer, Vishny (1994) used price-to-book ratios (P/B) and found that the stocks return which have low P/B are higher than the stocks return which have high P/B.

Ball and Brown (1968) for the first time noted a delayed reaction to the earnings announcements that cause a possible prediction of abnormal return. They labeled this under-reaction fact as *post-earnings-announcement drift* which is later confirmed by Foster et al., (1984), Bernard and Thomas (1989). A large part of the post-earnings-announcement drift occurs within 60 trading days despite some evidence of occurrence within up to 180 trading days (Bernard et al., 1989). The under-reaction of the stock prices to the publicly available, easy to reach earning announcements varies between 5.3% and 2.8% relative to the size of the company causing larger post-announcement drift (Foster et al., 1984). Similar to the earnings announcements, Michaely et al. (1995) investigated the effect of dividend omissions and initiations over the market price and found a long-term drift after the dividend initiations, but mainly for omissions announcements.

Banz (1981), Reinganum (1981) showed another surprising anomaly, "size effect", against the market efficiency. That is, the average stock returns of the smaller firms' portfolio is higher than that of larger firms' portfolio by an average of 10.3% annually. Many subsequent empirical studies also suggest that the existence of the inverse relationship between the sizes of the firm and the average returns of the firms' stocks. Two of them are Arbel and Strebel's (1982) study about the *neglected firm effect*, and Amihud and Mendelson's (1986) study labeled *liquidity effect*. Actually, both the neglected firm effect and the liquidity effect are highly related to the *size*

effect; indeed probably a result of it. That is, because the information about the small firms is less available, they can be neglected by the institutional investors causing lower liquidity in these stocks. Thus, these kinds of non-brand name, less liquid, unpopular stocks may give an abnormal return especially in January.

Another anomaly which needs to be clarified is the negative performance of the initial public offerings (IPOs) in the long run which is asserted by Ritter (1991), Loughran and Ritter (1995). After a careful evaluation of over 1500 IPOs in the USA in the period between 1975 and 1984, Ritter (1991) found that if an investor bought from IPOs and held it for 3 years, his or her terminal value of the 1$ purchased stock would be 1.3447$ whereas his or her terminal value of the 1$ worth of matching firms' stock became 1.6186$. IPOs' underperformance was around 16.9%.

Perhaps the most highly debated and controversial anomaly against the market efficiency is the *overreaction hypothesis*. DeBondt and Thaler (1985, 1987) investigated the future performance of the past losers and past winners. They formed a portfolio consisting of top 50 extreme stock winners and 50 extreme stock losers from NYSE in the period 1926-1982. Prior losers' portfolio outperformed by an average of 31.9% over the prior winners' portfolio within the three-to-five year period. Abnormal returns especially for the losers' portfolio occurred mostly in January. Dreman and Berry (1995) confirmed the overreaction and asserted a *mispricing-correction hypothesis* which is the process of the investors' correcting action of the over or under-valued prices (original misprice) through its fundamental value in the long run.

Besides all these anomalies about the predictability of stock prices, there are also anomalies about the seasonal movements in security prices. Very briefly, the day-of the week effect or weekend effect is the anomaly of positive stock return in Fridays and the negative stock return in Mondays. The intra-day anomaly is related with the continuous positive or negative stock return measurable in the specific hours or minutes. The January-effect anomaly is the fact that returns of the securities are higher in the January than the other months of the year. It is observed especially for the stocks which have low P/E ratio, and which are past losers or small size firms. The intra-month anomaly is the different return levels of second part of the

month (days between from 15 through 30) relative to the first part of the month or vice versa in any month of the year. The turn-of-the-month anomaly is the higher stock return in the last couple of days of previous month plus the first couple of days of the current month relative to the other days of the month in any month of the year. The turn-of-the-year anomaly is the higher stock return in the last couple of days of December plus the first couple of days of January relative to the other days of the year. The holiday's anomaly is related with the abnormal returns of stocks before the start of various holidays (Özmen 1997; Barak, 2008). Also, there are other anomalies related with weather, emotional state of human beings, geomagnetic storm, etc. (Oran, 2008).

There is no question about the existence of these empirically observable anomalies. Even, Fama (1991) accepts their existence. The question is whether these occur because of inefficiency of the market or some other problems and by chance. It is easy to discover an anomaly inconsistent with the efficient market hypothesis; however, highly difficult to explain the reason for their occurrence. Two views have been proposed to explain the anomaly. One side lead by Fama and French (1998) claimed that, because of the necessity of the using asset pricing theories in order to test market efficiency, the resulting problems (anomalies) are caused by asset pricing theories, or they can be attributed to chance. The other perspective lead by Kahneman and Tversky (1979), tries to explain anomalies by behavioral approaches based on prospect theory.

4. THE BEHAVIORAL APPROACH

As explained in earlier sections, humans have a desire to be rational and believe that they actually behave rationally. However, there are many observed anomalies, which should be clarified. Behavioral finance deals mainly with the discovery and explanation of the anomalies that are in stock markets, other financial markets, corporate environments and, in general, in all financial decision making situations.

Even though the psychological and sociological phenomena that affect human behavior are widely discussed in terms of behavioral science, their impact is relatively new in the area of finance and economics. Very frequently, human behavior is unclear and unpredictable in nature. Nevertheless, the researchers in behavioral finance found many biases that affect human behavior, using experiments and observations. However, it is extremely difficult to detect and classify the biases that cause erroneous investment decisions of investors. *Biases* are people's systematic errors of judgments when he or she makes a decision on something (Kahneman et al., 1998, pp. 2). Hirshleifer's (2001) complex classification, later simplified by Montier (2002), is widely accepted as taxonomy of biases that affect the investors' behavior based on the limited and incomprehensive number of research on this issue from the behavioral finance literature (Oran, 2008). Thus, biases that affect investor behavior can be classified into four sub-groups (Hirshleifer, 2001).

i. Self-deception
ii. Heuristics
iii. Emotions
iv. Social interaction

4.1. SELF-DECEPTION

Self-deception is the individuals' tendency to see himself or herself as more talented, smarter and better than others. This type of bias is due to the limitations of learning despite the economists' assumptions that people will behave rationally because he or she is experienced from past mistakes; however, they do not see them as mistakes. The findings related to self-

deception can be categorized under the following six headings (Montier 2002):

i. Overconfidence, over-optimism, illusion of control and illusion of knowledge
ii. Self-attribution bias
iii. Conservatism bias
iv. Confirmation bias
v. Hindsight bias
vi. Cognitive dissonance

4.1.1. Overconfidence, Over-optimism, Illusion of Control and Illusion of Knowledge

Overconfidence and *over-optimism* are the two most frequent biases. The illusion of control and the illusion of knowledge originate from a combination of overconfidence and over-optimism (Montier, 2002). People tend to be overconfident. The motivation behind overconfidence is the individual's overestimation of his or her knowledge and ability to control events (Daniel et al., 1998; Odean, 1999; Ritter, 2003; Nofsinger, 2005). For example when asked about their driving ability, 80% of the drivers in Texas rated their driving ability as above average (Svenson, 1981). Not only drivers, investors too are overconfident. Especially uneducated, inexperienced individual investors often exaggerate their skills to evaluate securities because they do not know their exact ability; moreover, they learn it from their past experience and they tend to credit their ability for successful investment and become overconfident (Gervais et al., 2001; Daniel et al., 1998). On the other hand, professional investors' tendencies to be overconfident are higher than individual investors when the predictability of the security is low especially in the early stages of his or her career (Griffin et al., 1992; Gervais, 2001).

Overconfident investors trade too much and continue it even when their trading costs are not covered by the expected gains and this causes a lower expected utility and increased volatility and investment choices in the wrong stocks. According to the survey of 78,000 accounts in the period between 1991 and 1996 in NYSE, within a 4 month period, the stocks that investors had sold continued to increase by 2.6% and the replaced stock increased only 0.11% (Odean, 1999). Moreover, Barber and Odean (2001) found that

men trade 45% more than women and this excessive trading reduced men's return by 2.65% while it reduced women's gains by only 1.72% when they analyzed 35,000 accounts in the period of February 1991 and January 1997 in NYSE. Men trade more and cut their return because they are more overconfident than women about their abilities especially when making financial decisions (Barber et al., 2001). Volatility in security markets increased by these excessive trading by both genders especially when they experienced successful investing activities in the past (Daniel et al., 1998; Odean, 1998; Odean, 1999).

Overconfidence also affects the risk perception of the investors and forces them to underestimate the risk because of two reasons. First, they tend to buy smaller and newer stocks which have high risks and secondly, they arrange undiversified or too little diversified portfolios (Nofsinger, 2005). Besides overconfidence, individuals are over-optimistic. In fact, overconfidence implies over-optimism (Hirshleifer, 2001). They have tendency to overestimate the possibility of the occurrence of favorable events and underestimate the unfavorable events. For example, according to the survey conducted in United States in 1998, when asked the chances of survival of the new venture, 81% of 2994 entrepreneurs believed their chance to survive had a possibility over 70%; moreover, 33% of them believed they have 100% chance to survive. However, in reality, 75% of new ventures went bankrupt within the first 5 years. Interestingly, only 39% of 2994 entrepreneurs believed that any of other similar ventures would be successful. People think their chances of success are higher than others even in the same type of business (Cooper et al., 1998). They are highly optimistic about their abilities because their over-optimism from time to time allows people to feel good (Griffin et al., 1992). For example, people often think they will not be involved in a traffic accident even though there are a lot of traffic accidents happening around them, or they underestimate the probability of certain diseases that they could experience.

As in overconfidence, men are more over-optimistic than women. In addition to gender concerns, over-optimism will decline as both men and women grow older. Moreover, people who are university graduates are more optimistic than high school graduates (Cooper et al., 1998).

People start to think they can control more factors when overconfidence and over-optimism come together. A person who exaggerates his or her ability and is over-optimistic can suffer the *illusion of control* bias which refers to the belief that they can influence the outcome of uncontrollable events (Nofsinger, 2005). For instance, people believe that they have better chance to win if they are able to choose the numbers in the lottery game rather than a randomly drawn number. People have a high tendency to accept betting on the toss of a coin before it has been tossed but have fewer tendencies to accept it after the coin has been tossed with a hidden result. They think they can control the outcome before the coin is tossed (Langer, 1975).

A person who is overconfident, over-optimistic and thinks he or she can control the outcome of uncontrollable events finally starts to think that additional information will increase his or her knowledge about something and improve his or her decision. This is exactly the *illusion of knowledge* bias which is the tendency for peoples' belief that the accuracy of their forecasts increase with more knowledge (Montier, 2002). The high ratings of web sites offering the statistics previous drawings of numerical-lotto and future predictions is the best example for the illusion of control bias. People think that they can increase their chance of finding out the future numbers by searching some statistics about them. In reality, there is no possibility of guessing exactly the future drawing numbers in a numerical lotto.

Sometimes increasing information can not help us for a decision because of *narrow framing*. If someone wants you a prediction on roll of dice, you could give a number from one to six. However, if he gives you a statistics about the past rolls, e.g. that the number in the last five throws was below four, you would probably narrow your forecast to from one to four. Yet, in reality, every throw is independent from each other and there is no lower chance of five or six coming up regardless of past outcomes (Nofsinger, 2005).

4.1.2. Self Attribution Bias

People do not know the exact capacity of their ability. Usually, they learn its level from their past successes and failures. However, they have a tendency to attribute success to their own ability, but they tend to blame external

factors such as market conditions or bad luck for their failures. Therefore, overconfidence results from the self attribution bias or more clearly the self attribution bias causes people to learn to be overconfident. Thus, with the help of this overconfidence, they will keep their faith that they will not fail in the future (Hirshleifer, 2001; Gervais et al., 2001). For example, when students get good marks from exams they attribute successful to their ability; however, when they get bad marks, they easily blame the teachers. It is possible to give many examples about the self attribution bias from all areas of life. For instance, soccer teams which lost the games immediately blame the referees. Many times the self attribution bias is also observed in investors' behavior. Especially during the bull market, it is easy to be successful relative to the bear market. However, the more success that the people experience, the more they will attribute it to their own abilities. As a result they trade more and take more risks (Nofsinger, 2005). The bull markets in NYSE with the leadership of technology shares in late 1990s, Istanbul Stock Exchange (ISE)'s incredible rise with the leadership of financial sector between 2003 and 2007 caused individual investors (especially not well-trained, newcomers) to attribute the successful investment to their own abilities. Self-attribution bias is stronger among men compared to women (Deaux et al., 1977).

4.1.3. Conservatism Bias

The *conservatism bias*, also known as the *status quo trap*, refers to the investors' tendency to be too slow in updating their beliefs in response to recent evidence (Barberis et al., 1998). Overconfidence combined with *anchoring* caused investors to change their views, ideas and estimates too slowly despite the new findings. Most investors prefer to do nothing and find it very hard to change their positions once it has been stated due to the fear taking responsibility of possible necessary actions because of the desire to protect egos from criticism and to avoid regretting. Even if they overcome these two important psychological factors, their movements occur too slowly because they generally believe the new information is temporary and think that sticking to their previous forecasts would be a better choice. This causes under-reaction especially to the earnings announcements in stock markets (Wu et al., 2009; Hammond, 1998; Montier 2002). We can also

observe conservatism bias in many aspects of life. For example, bureaucracy especially in such country like ours avoids taking action because later on they may be held responsible. If they remain conservative and maintain the status quo, no one can blame them for doing nothing. Moreover, frequently family men choose to remain conservative and select the status quo to avoid the responsibility of deciding very important things for the future of their children especially when there is more than one alternative. Like family men, investors often avoid changing their investment decisions because there are too many options of investing and to evaluate them needs extra effort (Nofsinger, 2005). Conservatism bias is highly related with the confirmation and hindsight biases.

4.1.4. Confirmation Bias

Most people don't like to be wrong because it is too hard to accept it. Thus, they are knowingly and voluntarily searching for information that confirms their ideas, views or forecasts. This hunger for agreement is known as *confirmation* or *confirmatory* bias which makes people feel good to hear their opinions supported by other people (Montier, 2002). People seeking confirmatory information overweigh the accuracy and reliability of confirming evidence in order to protect their self-esteem. The confirmation bias leads the overconfidence and causes polarization to ideas that confirm us. Investors may continue their unsuccessful investment strategies implicitly by avoiding alternative opinions in the financial environment because the confirmation bias keeps them from reaching the truth and allows them to think that they have superior ability consistent with the symptoms of the overconfidence (Rabin et al., 1999; Hirshleifer, 2001).

4.1.5. Hindsight Bias

The *hindsight* bias refers to the people's assumption that they could predict certain events before their occurrence and which sometimes is called *"I knew it all along"* effect (Hawkins, 1990). The usages of almanacs give rise to hindsight effect (Christensen, 1991). Because it is easy to look back a certain thing such as football game, political election, economic crisis, market bubbles etc. in the past and think it could be predicted (Montier,

2002). The reason for the hindsight bias is the individuals' desire to protect their self-esteem and this leads to overconfidence by encouraging the illusion that the world is more predictable place than it really is. Some economic experts' statements that they could predict crises before their occurrence, or some market analysts' comments on why the market behaved as it did within a minute from the closing of the stock market are very well known examples for hindsight bias (Hirshleifer, 2001; Kahneman et al., 1998).

4.1.6. Cognitive Dissonance

Cognition is defined as individual's information about him or his environment (Wicklund, 1976). People tend to seek a consistency between their beliefs, opinions, views and their actions. If there a disharmony exists between their behaviors and attitudes, this may cause a *cognitive dissonance* which is psychologically uncomfortable. For example, people continue to smoke, or some students cheat in the exam even though they know possible consequences, or a person who is on a diet but eats chocolate cake are very well known examples for cognitive dissonance. People first try to avoid the dissonance. However, they are too sensitive to this inconsistency and sooner or later the discrepancy between the attitudes and behaviors causes a psychological pain. Thus, they are motivated to resolve the dissonance. Moreover, they have three options in order to eliminate this mental conflict. *First*, they can reduce the importance of the dissonant beliefs. *Second*, they can acquire new information in order to outweigh the dissonant belief. *Third*, they can change the dissonant beliefs (Festinger, 1957). For instance, new car purchasers avoid reading the advertisements of other cars after the completion of purchase (Ehrlich et al., 1957). Because, they do not want facing the discomfort of having purchased the wrong car. But sooner or later, they discover one of the car features that do not meet their expectations. For example, let's say they realized that the car is not comfortable on long drives. In such a case, they immediately seek to reduce this cognitive dissonance. First, they try to reduce it by thinking they mainly use the car for short trips. Second, they may focus on the stronger features of the car such as safety, design, engine, and etc. Third, they get rid of the car (Kearsley, 2009).

Investors also seek to eliminate the cognitive dissonance especially for about the success of investment choices in the past. Since they have a tendency to believe that their investment decisions were good. Contrary to the evidences that they made a wrong investment decision, they filter the contradicting information to the extent not selling losing portfolios in order not to confess the bad investment decision because of the worry about protecting their self-esteem (Nofsinger, 2005; Shiller, 1998).

4.2. HEURISTICS

Heuristics are the shortcuts used to reduce the mental efforts in order to simplify the complex tasks and make the decision process easier. In general, they are quite useful because the necessary time and cognitive resources are limited to process and evaluate the related information for making judgments. However, they sometimes lead people to systematic biases (Tversky et al., 1974; Hirshleifer, 2001). Heuristics are rules of thumb caused from data processing errors (Montier, 2002). For example, when investors face N choices from the possible investment alternatives they follow 1/N rule to allocate their resources equally through possible options (Benartzi et al., 2001) or choose looking for the past performance shortcuts as an investment style (Shefrin, 2002). Researchers from the field of cognitive psychology found out that people use shortcuts rather than their cognitive capacity effectively because it is too hard to process data when they installed excessive information. Moreover, very little information and lack of time for thinking carefully also have impacts to use the shortcuts (Aronson, 1999). The most common heuristics are (Oran, 2008);

i. Salience, Cue Competition, Availability (SAC)
ii. Representativeness
iii. Mental Accounting
iv. Anchoring

4.2.1. Salience, Availability, Cue Competition

As stated above, because of the nature of difficulties in deciding on something especially when we have more than one option or when we are faced with a difficult task, we use some shortcuts. Salience, availability, cue

competition are the heuristics which are often used interchangeably. They all the mechanisms related with decision processes.

Salience, sometimes called *familiarity* bias, refers to people's tendency to use more obvious and familiar data when making decisions. For example, investors who are subject to these biases may prefer to invest in companies frequently seen in media or in brokerage house recommendations rather than in others (Oran, 2008). The company's name will attract their attention and the cues they have selected will remain somewhere in their minds by either the effect of the news or advertisements. In fact, according to Gadarowski (2001), investors who bought stocks with highest press coverage suffered underperforming investment choices in the following two years. Investors are too confident and optimistic for trading the stocks that they are familiar with whereas they are pessimistic about stocks. Salience and familiarity influence the risk perception of investors. For example, it is commonly seen that many people invest in local firms, employees invest in their company's stock, or fans invest in their team's stock irrationally (Nofsinger, 2005).

Availability heuristic refers to the ease with which things come to mind and is highly related with attention and experience. Salience affects the remembering of the instances. For example the impact of actually seeing a burning house, is probably greater than reading news related to a burned house in the newspaper (Tversky et al., 1973).

Attention is affected by salience of the object (Shiller, 1998). Psychologists call salient or vivid information *cues*. And people use these cues, called the *cue competition*, in order to decide even if they contain less or improper information. The bright light, attractive images and colors, capital letters all are recognized as cues by our brain. When the time for decision comes, we quickly scan our memory and find these significant cues in our minds and use them for deciding without checking their accuracy. In fact, salient cues reduce the impact of less salient ones (Hirshleifer, 2001). Tversky and Kahneman (1973) asked the participants whether in a typical English document, one would find more frequently word by starting with the letter K or words whose third letter is K. 69.07% of the participants said that the former would be more frequent; however, the latter is twice more frequent in reality. They suffered availability bias because of the words which begin

with K come to mind more easily. Another example, after seeing a film like "Jaws", which one do you think has greater probability of occurring? A death resulting from a shark attack or from lung cancer?

It is too hard not to suffer from these biases especially when quick decisions are needed because we always take some significant cues from every experience we had, every person we met, and even almost from all external factors we come in touch with. And there is always a possibility that these cues may be inaccurate. The usages of these biases may be very common. Salience is the key, because it affects the availability, attention, memory and familiarity, and thereby the cue competition.

4.2.2. Representativeness

People judge events by looking of their appearance and predict the possible outcome that seems the most representative of the evidence by ignoring statistics about what they actually are and whether they can really represent the universe (Montier, 2002; Kahneman et al., 1973). People tend to use small samples which can reflect the essential properties of parent population. Moreover, they are biased by focusing mainly on the salient features of the parent population in determining a sample which ought to be population as representative. In other words, *representativeness* is an excessive attention on the accuracy of the salient evidences (Tversky et al., 1974; Barberis et al., 1998). For example, consider Linda.

She is 31 years old, single, outspoken and very smart. She graduated from philosophy. In the university, she was deeply interested in subjects related with discrimination and social justice. Moreover, she actively participated in demonstrations against nuclear plants. Is Linda a bank teller or a feminist bank teller?

This typical question was asked by Tversky and Kahneman (1974) and 90% of participants characterized Linda as a feminist bank teller. Participants were focused on Linda's concerns through discriminations and social justice and her participation on the anti-nuclear demonstration and they thought she is a feminist bank teller on the basis of these salient features. In reality, the probability of being feminist and bank teller at the same time is much lower than being only a bank teller. In fact, second option is a subset of first one. The participants simply underweighed the base rate because people

who just work in banks outnumber those who both work in banks and also are active participants in feminist movement (Montier, 2002).

Investors are also biased from representativeness. For instance, they overweigh recent years' data and occurrences and underweigh the long term averages. In the bull market condition, investors start to think that the high equity returns are very normal (Ritter, 2003). They also confuse good firms with good investments. We label a company as good or poor by looking at many indicators. Some of these are strong earnings, high sales, quality management, etc. On the other hand, good investment occurs only when your stock price increases more than the others (Nofsinger, 2005). Moreover, they optimistically forecast the continuation of high future growth for the firms which have experienced high growth in the previous five years. But they fail to understand that the high earnings growth in the past is unlikely to repeat itself in the future (Barberis, 1998). According to DeBondt and Thaler (1985) and Lakonishok et al., (1994) the long-term performance of the firms and their stocks have a tendency to revert to the mean. However, investors believe that the past return performance of the stock is the main indicator of its future path (Nofsinger, 2005), and this causes an overreaction (Barberis et al., 1998; Wu et al., 2009). Investors often look at the highest winners and losers from the media and this causes a trend chasing because people from start to think that trends have systematic causes (Hirshleifer, 2001). Investors' trend chasing is like a "hot hand phenomenon" in the basketball. According to this phenomenon, the probability of a successful shot increases after a successful shot and vice versa. However, Gilovich and et al., (1985) investigated NBA teams' past data of basket shots and found no correlation between successful and unsuccessful shots; they are serially independent. Despite this scientific fact, the validity of this phenomenon is seriously accepted in the basketball arena just like the preference for technical analysis despite the efficient market hypothesis.

Finally, it can be said that representativeness bias is highly related with confirmation bias, but it conflicts with the conservatism bias (Ritter, 2003).

4.2.3. Mental Accounting

Accounting is the measurement and description of the results of economic activities (Meigs et al., 1996, pp. 3). Like organizations, people also use

their accounting system in order to trace their economic activities. But individual's accounting system is a little bit "psychological"; that is, many times 1$ is not equal to another 1$ in their minds. Tversky and Kahneman (1981) used the term *psychological account* as an individual's own accounting system, but Thaler (1980) coined the term *mental accounting* for the first time which was accepted as a comprehensive term by many academicians. Mental accounting is the set of cognitive operations used by individuals to organize, evaluate, and keep track of financial activities which can be balanced daily, weekly, monthly, and can influences the choices (Thaler, 1999b, pp. 183). Consider this typical example (Tversky et al., 1981, pp. 457):

"Imagine that you have decided to see a play where admission is 10$ per ticket. As you enter the theater you discover that you have lost a 10$ bill. Would you pay10$ for a ticket for the play?"

88% of the 183 participants said they would still pay 10$ for a ticket for the play. After this result, Tversky and Kahneman (1981) changed the format of the question.

"Imagine that you have decided to see a play and paid the admission price of $10 per ticket. As you enter the theater you discover that you have lost the ticket. The seat was not marked and the ticket cannot be recovered. Would you pay $10 for another ticket?"

This time, the 46% of the 200 participants said "yes". In both cases, the total cost for seeing the play is 20$. Under expected utility theory, 20$ must be equal another 20$ no matter what the circumstances are. So, why do people accept to pay another 10$ when they lose a bill, but do not accept it when they lose the ticket? Because, people segregate different costs into different mental accounts and they weigh these different accounts by looking at the effects of the costs. As seen from the example, the psychological impact (pain) of losing the ticket is higher than that of losing same amount of money because people do not relate the "lost money" with the "play" whereas the lost ticket is directly related with the "play". Simply, in participants' minds the "lost money" and the ticket are not substitutable even though the total costs are same.

Recall from section 2 that the presentation of the decision problem could lead to a deviation from the rational behavior. People hate to lose because it

is hard to face its psychological pain and thus they become loss averse (Montier, 2002). People avoid losses because they feel doubled pain when they lose compared to feeling pleasure when they win (Tversky et al., 1992). The loss aversion behavior causes the narrow framing of the choice problem. In this sense, it can be said that mental accounting is highly related with prospect theory because the loss aversion and the narrow framing are the central themes of the prospect theory (Thaler, 1985; 1999b; Barberis et al., 2001). Moreover, as stated in chapter 3, the equity premium puzzle which is the individuals' tendency to view the bond's yield as higher than the stock's return despite the fact that stocks outperformed over bonds with a high margin can be explained by the narrow framing and the loss aversion which is known as myopic loss aversion (Barberis et al., 2006; Mehra et al., 1985). According to modern portfolio theory investors have to consider *three* important characteristics of each potential investment. *First*, the expected return, *second* the risk and the *third* is the correlation between the returns of each investment which is difficult to implement because of mental accounting. Thus, investors place each investment into separate mental accounts and ignore the interaction between investments which cause an evaluation of each investment alone (Nofsinger, 2005). Moreover, because the value of the stocks could go up and down, investors who are more sensitive to losses than gains (as the prospect theory says) can suffer more pain in the stock market. That's why they are myopic on losses.

Maybe, the most important impact of the mental accounting is the *disposition effect* (Kahneman et al., 1998; Thaler, 1999b; Grinblatt et al., 2004). Shefrin and Statman (1985) exhibited that investors have tendency to sell the "winning stocks" too soon and holding or avoiding to sell "losing stocks" too long. They labeled this a disposition effect. The reason for this again psychological because we seek pride and avoid regret. And selling the losing stock means a realized loss. The psychological pain of realizing the loss is greater than the unrealized loss because a realized loss means the declaration of unsuccessful investment. Investors avoid declaring the failed investment decision because they are afraid of facing their failures in order to protect their confidence and self-esteem. Moreover, they choose to wait for the reversion of the downward stock's price to go up at least to its

purchase price. According to Kahneman and Riepe (1998), many investors take the purchase price as a *reference point* and use it in order to assess the outcomes as gains and losses. Thus, they choose not to sell. Even if they decide to sell, they immediately blame external factors for failures (self attribution); furthermore, according to Lim (2004), they prefer to integrate losses that are selling the losing stocks on the same day. On the other hand, investors seek the declaration of their successful investment decision in order to be proud of them. Moreover, contrary to losses they segregate gains; that is, selling the winning stocks on different days in order to taste the victory for a long time. Once their stock price is increasing, they become impatient to sell and want to realize their gains. However, according to Odean (1999), the investors' seeking pride make them impatient to ride their winners cause a reduction from the potential extra gains. As I stated in overconfidence bias, he found that within the 4 month period, the stocks that investors sold continued to increase by 2.6% and the replaced stock increased only 0.11% by analyzing 78.000 accounts in the period between 1991 and 1996 in NYSE.

Mental accounting also causes naïve diversification (Thaler, 1999). For example, when they face N choices from the possible investment alternatives, they follow 1/N rule to allocate their resources equally through possible options (Benartzi et al., 2001).

4.3. EMOTIONS

Emotions are the barriers in front of rational behaviors which affect many biases and heuristics and are highly observed in the preferences under risk and time considerations (Hirshleifer, 2001). For example, "regret" is one of the emotional feelings (Shefrin, 1985), and when the investor is regret averse this ultimately causes a disposition effect. Loss aversion which is an important feature of the prospect theory is also based on emotion. People are loss averse because they hate to lose. "Hate" is also emotional. In fact, human emotions like fear, greed, happiness, and excitement prevent successful trading despite those make us human (Elvin, 2004, pp. 151-152). Despite it is too hard to describe which emotions can affect investor behavior and how, the most widely accepted classification is (Hirshleifer, 2001);

i. Mood
ii. Time preferences and self-control
iii. Ambiguity aversion

4.3.1. Mood

People's choices under uncertainty, especially for the future prospects, can be affected by their mood. People are optimistic if they are in a good (happy) mood, and they are pessimistic if they are in a bad (sad) mood (Wright et al., 1992). Investor's investment activities are also affected by their mood. While it is quite difficult to determine which mood investors are in, there are some empirical evidences that show us which moods affect the investors' decisions and how. There is a strong relationship between the degree of the sunshine and the mood of the person. We are in a good (happy) mood if the sun is shining and we feel relatively bad when there is no sunshine (Nofsinger, 2005). From this point of view, according to Saunders (1993), there was a relationship between the weather of New York City and the NYSE returns; that is, when the weather was cloudy, the index returns tended to be negative. Hirshleifer and Shumway (2003) confirmed the relationship between the weather and the stock market returns in 26 cities including New York, London, Paris, Sydney, etc. They found that daily returns of stock markets of these cities' in the sunny days were higher compared to cloudy days. The average sunny day's returns of 26 cities were 24.6% higher than cloudy days' returns on yearly basis. Moreover, according to Kamstra et al. (2003), the duration of the daylight also affects the stock market returns. The northern hemisphere countries' stock markets' returns are lower in the fall; the southern hemisphere countries' stock markets' returns are lower in the spring compared to the rest of the year because of the duration of the daylight.

In fact, we observe the effects of mood in the consumer choices. For example, after the victory of the national soccer team of Turkey in 2002, the demand for the national flag was boosted. After the news related with a terrorist attack in Antalya, some of the reservations were immediately cancelled. We can extend the list easily and there is no doubt that the moods we are in affect our choices. Even our tipping behavior varies with mood; that is, people tip more on sunny days compared to rainy days (Rind, 1996).

4.3.2. Time Preferences and Self-Control

As stated in section 3, individuals prefer cash dividends over capital gains even though the dividend income is taxed higher than capital gains (Miller, 1986). Behavioral finance researchers have an explanation for this anomaly from the mental accounting perspective. Investors simply segregate dividends into different mental accounts rather than the overall utility of the stock. That is, they have a tendency to recognize the cash dividend as an income, not as capital. Moreover, because of the desire not to use or reduce the capital, they prefer cash dividend and they value dividends for self-control reasons (Shefrin, 2002, pp.30). Furthermore, the discount rates which are very critical in calculating the present values of future incomes can change with circumstances (Hirshleifer, 2001). In other words, people use a lower discount rate; first, for losses than for gains; second, for large magnitude amounts than for small ones; third, for the longer time periods than for shorter ones. These different usages of discount rates, also known as hyperbolic discounting, causes inconsistent preferences with respect to time changes. For example, many people opt for getting 50$ immediately rather than 100$ in 2 years; however, many of them choose to take 100$ in a 6 year period rather than 50$ in a 4 year period (Ainsle, 1991, pp. 334).

4.3.3. Ambiguity Aversion

People dislike uncertainties and they are averse to *ambiguity* especially when lacking information. Moreover, they perceive the ambiguity as a risk and behave irrationally (Hirshleifer, 2001, pp. 1550). However, risk and ambiguity are different terms. The term "ambiguity" contains the term "risk" and risk refers to the *measurable ambiguity*. The distinction between risk and ambiguity is best illustrated by Ellsberg (1961). In his classical experiment, Ellsberg (1961, pp.10-11) arranged two buckets containing red and black balls. Bucket *one* contained a total of 100 balls 50 of which were black and the other 50 were red. Bucket *two* contained again 100 balls, but

this time the exact composition was not known. In other words, bucket *two* may contained 0 through 100 black, and 0 through 100 red balls. After these explanations about the contents of the buckets, Ellsberg wanted from the group of participants to choose a ball from either bucket and guess the color of the ball before they made their choice and, if they guessed right, they got 100$ for each correct guess; wrong guesses would not cost them anything. Briefly, the participants knew the composition of bucket one; that is, they had 50% chance of choosing black and 50% chance of choosing red balls. They faced a measurable ambiguity (risk). Because the information about the contents, uncertainty was somewhat dissolved. On the other hand, the lack of information about the content of bucket two caused an ambiguity. As a result, the majority of the participants chose to bet on either red or black balls from bucket one.

The ambiguity affects the decision weights in prospect theory and that certainly influences the choices (Tversky, 1981). The investor's choices are highly influenced by the ambiguity effect; that is, they increase the risk premiums because lack of information is associated with higher risk (Hirshleifer, 2001). Moreover, they have tendency to buy when good news arrives and to sell on bad news (Epstein et al., 2002).

4.4. SOCIAL INTERACTION

Human beings are social creatures. We learn a lot from our interactions with others especially with talking and listening. Actually, we need such interaction when we search for confirmatory evidence to our opinions or when we are undecided about a given choice. Since the late 1980's, people have stopped maintaining secrecy activities and started to share them more openly. As more people started to talk, others became more and more interested. This kind of attention to investment conversations has especially increased after the launching of financially specialized, publicly available broadcasting like CNBC et al. since late 1980s (Nofsinger, 2005). As a result, while around 31% of American households chose to invest in the stock market in 1989, the participation rate jumped to around 40% in 1995, and to around 49% in 1998 (Bertaut, 2000, pp.7). There may be many reasons for this considerable increase, but surely, social interaction is an important one among them. According to survey done by Hong et al.,

(2004, pp. 139) among 7500 households in the USA, the social interaction with other people helps increase stock-market participation either because of word-of-mouth sharing or enjoyment that people get from talking about investment styles and choices.

Social contagion, imitation and *herd behavior* are commonly observed and accepted types of social interactions in markets despite the fact that it is too hard to classify how and which kind of interactions occur among people and investors (Oran, 2008).

4.4.1. Social Contagion, Imitation and Herd Behavior

People who interact with each other regularly tend to think and behave similarly (Shiller, 1995, pp. 181). According to social psychologist Solomon Asch (1956), individuals can easily change their ideas when they face a group of people who think differently even if they believed they were certainly right. People tend to accept ideas within the group because they have a tendency to remember the ideas, conversations, rituals and symbols that are accepted by the group because of limited attention. As a result, with the social contagion people start to think and behave like the group without investigating their accuracy (Shiller, 1998). Investors are also affected by other investors' opinions when trading. Shiller and Pound (1986, pp. 13) conducted a survey about the contagion of professional investors' interests. They found that nearly 63% professional investors were influenced by the recommendation of colleagues when trading. Moreover, professional investors discuss a specific stock with on the average 16 people before deciding to buy. Interestingly, approximately 7 people out of 16 involved became interested in that specific stock (Shiller et al., 1986, pp. 19). Devenow and Welch (1996, pp. 603) called this influence a "first-order effect".

Another factor of people's tendency to change their ideas when they are in a group is the fear of being left alone in the group. Asch (1956) found that individuals answered correctly when they asked alone; however, they can easily change their correct answers when they are in a group. When they are in a group, they are in the mood of avoiding conflicts with the group because of the social pressure. They are in doubt about their decision because they think so many people would not think wrongly. Therefore,

with social contagion or imitation, individuals behave differently than when they are alone when they do not have much interaction with others either because of limited attention or the fear of being left alone in the group.

Social contagion and imitation cause a chain of correlated actions of individuals which is called a *herd behavior*. Herd behavior can be defined as correlated behavior patterns across individuals; that is, everyone behaving in the same manner as everyone else; even if their private information otherwise (Devenow and et al., 1996, pp. 604; Banerjee, 1992, pp. 798).

Despite it is too hard to distinguish social contagion, imitation, and herd behavior from each other, it can be said that imitation, together with social contagion, causes the herd behavior, and herd behavior is the observed imitation and/or social contagion. This is the irrational view of explaining explain the herd behavior. Actually, there are two different approaches which attempt to explain the reason behind the herd behavior. One is the rational view; the other is the irrational view. The irrational view says the reason behind herd behavior is psychological; that is, defined by the logic of social contagion and imitation. According to Hirshleifer and Teoh (2003), the immediate rise in the stock or commodity which is bought by Warren Buffet can be explained only by the irrational view of herd behavior. It is the common belief of many investors, especially individual ones, that the most successful investment tactic is to copy the successful investment tactics of the successful traders.

On the other hand, according to the rational view, herd behavior occurs in financial markets because of the imperfect information, concern for reputation, and the compensation structures (Bikhchandani and et al., 2001, pp. 283).

If investors have a limited set of information, due to difficulty of reaching information, investors choose to observe the others. Banerjee (1992) observed a group of customers who have to choose one of two side by side restaurants. He found that first customer uses his own judgment in choosing the restaurant, but if the second customer decides by ignoring his own information, it causes a follow-the-herd behavior for the rest of the customers (Banerjee, 1992, pp. 799). Bikhchandani and et al., (1992, pp. 994) called this kind of ignoring private information signal and act by taking account of the choices of others as an *informational cascades*.

Two authors in United States (US) secretly bought 50.000 copies of non-best seller book in 1995. Because of their purchasing operation the book became popular on the bestseller list of the New York Times. Despite the criticism about the content of the book, customers started to buy and the book continued to be in the bestseller list (Bikhchandani and et al., 1998, pp. 151). People used informational cascades rather using their own information in purchasing the book.

The investors, especially the individual ones, also use informational cascades because there are many alternatives available for investment decision and to evaluate these alternatives one by one can be costly and time consuming. Many times investors seek to learn the other investors' trading activities by observing which finally causes a herd behavior in financial markets (Bikhchandani and et al., 1998). The first few investors set the direction of herd behavior; the others follow them (Bikhchandani and et al., 2001).

The other reasons for herd behavior are the concern for reputation and compensation structures. If you know that your loser stock is bought by many other investors, your feeling of regret becomes lower (Nofsinger, 2005). Scharfstein and Stein (1990, pp. 478) called this "sharing-the-blame". This is one of the major reasons for the observed herd behavior among institutional and professional investors. The professional investor's trading abilities can not be questioned even if his or her portfolio is losing at a time when many other professional investors' portfolio loses. On the other hand, his or her trading skills can be questioned if he or she can't achieve to manage a winning portfolio at a time when others have winning portfolios. In short, there is no problem if you lose when everyone else is losing, but there could be a serious problem if you can not win when everyone else wins. Moreover, the performance evaluation of the professional investors is done by looking at their relative performance with respect to other managers instead of evaluating their absolute performance. Thus, many professional investors imitate others and shape a similar portfolio in order not to fall behind the competition (Borensztein and et al., 2001). They simply "hide in the herd" to preserve the reputation and "ride the herd" to prove their quality (Devenow and Welch, 1996, pp. 605). Indeed, money managers' imitation is rewarded (Bikhchandani and et al., 2001, pp. 280).

When we look at the herd behaviors that are observed in financial markets, we first see the Dutch Tulip Mania in the history. The price of the tulip bulbs increased and decreased nearly 20 times in Holland within almost a one year period in 1630s. Another historic example for the herd behavior in financial markets is the South Sea Company Bubble. South Sea Company established in the United Kingdom had some trading privileges around South America in the 1720s. Investors believed that with these privileges the company would become a monopoly in the South Sea of America and they would earn large money. This belief caused a nearly 9 times increase in the stock price of the South Sea Company. However, after the realization that the expectation would not be realized, its stock price decreased nearly 9 times and all these happened approximately within a one year period.

Herd behavior has been observed best in real estate markets. Many countries experienced a bubble in their real estate markets because of the herd behavior. Well known examples are Japan in late 1980s and the recent mortgage crisis in US. Perhaps the most interesting herd behavior; however, is the "dot.com" bubble in US in late 1990s.

The incredible developments in technology during the last two decades of the 20th century gave rise to research and development activities in the computer and communication sciences that eventually led to the birth of the "internet". Launching the internet enabled firms to embark on a new type of business. Soon, some internet firms like Yahoo and eBay were established. But the strange thing was the investors' high valuation of these firms. In late 1990s, Yahoo's P/E ratio was 1300 and eBay's was 3300 where the historical market P/E ratio averaged only 15. Moreover, investors valued the internet-based firms higher than the old economy firms even in the same business. For example, after the IPO, investors' valuation of the new established online toy retailer company eToys which had $28.6 million negative earnings from $30 million sales was $8billion while they valued the traditional toy retailer company Toys "R" Us $6billion despite its $376 million profit. But after the Toys "R" Us's quick development of its online retail capacity, the value of eToys decreased from $8billion to $29 million (Nofsinger, 2005, pp.83).

As a matter of fact, it is very normal to observe these herd behaviors in the history because undoubtedly humans are not super calculators devoid of

emotions; on the contrary, in fact they are subject to many psychological and physiological limitations. To imitate is one of these limitations and it is very natural and instinctive. Thus, we ought to expect to see many other strange herd behaviors in the near future.

5. THE RESEARCH

5.1. RESEARCH TOPIC

The purpose of this research is to find out clues about the irrationality of individual investors using the behavioral approach discussed in the previous section. There is no comprehensive survey-based study that aimed to find out the possible psychological factors which affect the investment decisions of individual investors in Turkey. The researches done by Dünya İktisadi Araştırmalar in 1991, Doğukanlı and Önal (2000), Döm (2003) mainly targeted on finding out the profile and demographic factors of the investors and their risk-taking attitudes in Turkey. Singhvi's (2001) survey study in US with 105 individual investors is mainly related to the risk perceptions of the individual investors, their stock market outlook and the possible factors which affect their decisions in the context of when and how much to invest in US stock markets. The factors which affect human behaviors and decisions that are mentioned in the previous section are based on the researchers', particularly cognitive psychologists' observations and experiments under controlled laboratory conditions. So far, how and to what extent these factors affect investors' decisions in real life have not been tested yet. In this regard, it is also expected that this study will provide the foundation for further survey-based studies which focus on the psychological factors that affect the investors' decisions when trading.

5.2. RESEARCH DESIGN AND IMPLEMENTATION

This research is designed as a survey and is prepared in two phases. In the first phase, Hirshlaifer's (2001) classification and other leading behavioral finance theorists' researches about the factors which limit and direct the human behavior are reviewed carefully; the common mistakes (or biases, or traps) were determined and survey questions prepared in order to discover the mistakes of individual investors. 15 individual stock investors with at least one year stock investment experience were picked and given the pilot survey. The answers were taken and evaluated while their comprehension of the questions was observed.

In the meantime, an expert group of 8 people with at least Ph.D. in finance and related areas were also given the pilot for further fine tuning of the questions.

After the first phase, the questionnaire was finalized and then applied to the subjects. Actual surveys were conducted among the customers of some banks and brokerage houses with the help of customer representatives on face to face basis.

The research was done in February, 2009. In the first section, 9 demographic statements were asked to the individual investors who have at least one year experience in equity investing. The second section consists of 32 behavioral questions which are thought to be related with the 16 factors that influence the human behavior as mentioned in the behavioral approach section (Appendix A, B). The *strongly disagree, disagree, neither agree nor disagree, agree*, and *strongly agree* were given as alternative choices (per five point Likert scale) to the behavioral statements. To avoid the problem of "missing value" in analysis, we warned subjects in order not to leave any questions blank and choose the "neither agree nor disagree" choice in case they were not sure about the response. Therefore, we do not have any "missing value" in any questionnaire in the research. Consistent with the targeted subjects, the investors who do not have at least one year experience in equity investing have not been considered. Totally, there are 135 individual investors who participated in the survey, mostly from Istanbul, Ankara and Izmir.

Sample members were chosen on a convenience basis by customer representatives in several contacted banks and brokerage houses. Ideally, the research should have used a random sample. Due partly to time and financial limitations and partly to the practical impossibility of finding complete lists of the population, convenience sampling had to be used. However, those customer representatives in banks and brokerage houses who selected the sample members were clearly instructed not to be biased in their selection process. Therefore, the sample may be assumed to be quite reliable.

It is not claimed that these behavioral statements certainly reveal the factors that affect investor psychology. However, this research is the first

attempt to find out how the investors' answers are related with the cognitive errors mentioned above.

5.3. ANALYSIS

5.3.1. Analysis of the Demographic Questions

In this section, the frequency and the percentage distribution of 9 demographic questions are given.

Table 5.1: Age groups of the participants

Age Group	Frequency	Percent
21-30	51	37,8
31-40	55	40,7
41 and higher	29	21,5
Total	135	100,0

Table 5.1 displays the age distribution of the sample. The youngest participant's age is 21 and the oldest one is 67. Both the median and mode values are 32.

Table 5.2: Participants by gender

Gender	Frequency	Percent
Female	36	26,7
Male	99	73,3
Total	135	100,0

When we look at the gender of participants, as seen in Table 5.2, there are 36 women who responded the survey which means 26,7% of all participants where there are 99 men of which 73,3% of all respondents. It is seen that the percentage of the women participants are relatively low; however, the previous surveys similar to this research had lower female respondent percentages. Besides, number of the female participants is adequate for analyzing gender differences.

Table 5.3: Education levels of the participants

Education	Frequency	Percent
Primary School	4	3,0
High School	34	25,2
Undergraduate	68	50,4
Graduate	29	21,5
Total	135	100,0

As seen in Table 5.3, half of the investors (50.4%) have undergraduate education. Those with undergraduate plus graduate education constitute 71.9%, while 28.2% of investors have only primary and/or high school diploma.

Table 5.4: Income levels of the participants

Income Level	Frequency	Percent
2000 TL and below	52	38,5
2001-3000 TL	44	32,6
3001-4000 TL	23	17,0
4001-5000 TL	5	3,7
Above 5000 TL	11	8,1
Total	135	100,0

The investors' responses to the question concerning their monthly income are seen in Table 5.4. 71.1% of them responded that they had an income below 3000 TL. The percentage of people whose monthly income is above 4000 TL is only 11.8. When assessing the responses, it should not be forgotten that people generally understate answers to questions related to their financial status.

Table 5.5: Marital status of the participants

Marital Status	Frequency	Percent
Married	94	69,6
Single	41	30,4
Total	135	100,0

As seen in Table 5.5, 69.6% of the participants is married.

Table 5.6: Number of dependent(s)

Number of dependent(s)	Frequency	Percent
None	37	27,4
1	24	17,8
2	36	26,7
3 or more	38	28,2
Total	135	100,0

The responses of the investors to the question related with their number of dependents are seen in Table 5.6. 27.4% of the investors have no obligation to look after someone, where as the percent having at least one dependent is 72.6.

Table 5.7: The number of the firms' stocks in the participants' portfolio

Number of the Firms' Stock in the portfolio	Frequency	Percent
None	37	27,4
1	19	14,1
2	31	23,0
3	21	15,6
4	13	9,6
5 or more	14	10,4
Total	135	100,0

Investors' responses to the question about their stock portfolio content are seen in Table 5.7. Of course, the responses may vary from time to time because of the many factors such as the general conjuncture of the stock market and the economy itself. In the research period, 27.4% of the investors declared that they did not have any firm's stock in their portfolio, 10.4% of them had invested to five or more firms' stocks, 14.1% of them reported as they had invested in only one company's share and 48.2% had invested in two to four firms' stocks. These findings demonstrate that diversification is not achieved by this group of investors.

Table 5.8: Investment experience of the respondents (years)

Investment experience (years)	Frequency	Percent
1-3	45	33,3
4-6	40	29,6
7-10	24	17,8
11 or more	26	19,3
Total	135	100,0

The investors' responses to the question related to their stock market investing experiences are seen in Table 5.8. The question was directly asked and the answers were grouped in order to make more efficient analysis.

Table 5.9: Percentage invested in stocks in a portfolio of 1000 TL

Percentage invested in stocks in a portfolio of 1000 TL	Frequency	Percent
Below 25%	36	26.7
25%-49%	25	18.5
50%-74%	27	20
75%-100%	47	34.8
Total	135	100,0

As seen in Table 5.9, 45.2% of the respondents preferred 49% or less investment in stocks, 20% of them prefer to have stock investments 50%-74%, whereas 34.8% have 75%-100% of 1000 TL in stocks.

5.3.2. Analysis of the Behavioral Statements

In this section, first, the frequency, percentage distributions, and the mean values of the answers to thirty two behavioral statements and average mean values of sixteen behavioral biases are given. Higher than the level of three (3) averages mean value is accepted as the existence level for the relevant bias.

Second, Kolmogorov-Smirnov one-sample goodness of fit test is used in order to find out whether the responses are uniformly distributed or not. According to Siegel and Castellan (1998, pp. 54-55), Kolmogorov-Smirnov test is the more powerful to test the goodness of fit. Two tailed test is

selected because the answers have both positive (agree) and negative (disagree) sides.

According to the test results, none of the thirty two statements have either asymptotic or exact p values greater than 0.001 shows that the null hypothesis of uniformly distributed answers is rejected at the 99% confidence level. Thus, a common tendency about the behavioral implication in statements is observed.

Third, Cronbach's Alpha test is conducted in order to find out the reliability of the survey. It is found 0.819 (81.9%) Cronbach's Alpha reliability value.

5.3.2.1. Statements related with overconfidence bias

Average Mean: 3.33

Table 5.10: I find winning stocks even when the stock market declines (Statement 1).

	Frequency	Percent
Strongly disagree	8	5,9
Disagree	23	17,0
Neither agree nor disagree	31	23,0
Agree	57	42,2
Strongly agree	16	11,9
Total	135	100,0

Mean: 3,37

Table 5.11: My ability to pick the stock is above that of an average investor (Statement 17).

	Frequency	Percent
Strongly disagree	5	3,7
Disagree	24	17,8
Neither agree nor disagree	47	34,8
Agree	46	34,1
Strongly agree	13	9,6
Total	135	100,0

Mean: 3,28

The motivation behind the overconfidence is the individual's overestimation of his or her knowledge and ability to control events (Daniel et al., 1998).

Thus, two statements related with overconfidence were given in order to find out whether individual investors exaggerate their abilities. Svenson (1981)'s survey question about the driving skills of the drivers was the inspiration for these statements. As seen in Table 5.10, 54.1% of survey participants thought that they can find winning stocks even when the stock market declines. Of course, it is possible to find winning stocks during a bear market, but it is too difficult to believe that such a large percentage is so capable.

For finding the overconfidence of the investors, while the statement 1 was an indirect statement, the ability of the investors to pick the stock was directly given in statement 17. As a result, with this direct questioning, 43.7% indicated that they possessed on ability to pick the stock is above that of the average investor. As seen from the percentages, subjects seem to be more confident in their answers to statement 1; however, they express their overconfidence directly as observed from the responses to statement 17.

5.3.2.2. Statements related with over-optimism bias

Average Mean: 3.35

Table 5.12: Once the stock market indices start to rise, I think they will continue to increase in the future as well (Statement 10).

	Frequency	Percent
Strongly disagree	12	8,9
Disagree	30	22,2
Neither agree nor disagree	47	34,8
Agree	42	31,1
Strongly agree	4	3,0
Total	135	100,0

Mean: 2,97

Table 5.13: The chaos created by a crisis is a thin veil hiding great opportunities (Statement 24).

	Frequency	Percent
Strongly disagree	4	3,0
Disagree	14	10,4
Neither agree nor disagree	30	22,2
Agree	54	40,0
Strongly agree	33	24,4
Total	135	100,0

Mean: 3,73

According to Hirshleifer (2001), overconfidence implies over optimism. Thus, we expect the overconfident behavior of investors (statement 1 and 17) would continue as an over-optimism in statement 10 and 24. Statement 10 and 17 did not clearly indicate whether the investors are over-optimistic or not. 34.8 % were neither agree nor disagree whether the stock market will continue to rise once it starts to rise whereas 34.1% were sure it will continue, and 31.1% thought just the opposite. Because the percentages were close to each other, this statement did not reveal much about the over-optimism of the investor.

However, the picture can be more clearly seen from the responses to statement 24. 64.4% of the survey participants perceived the chaos created by a crisis as a thin veil hiding great opportunities. Only 13.3% of did not believe so. There is a cliché that everyone knows. The second meaning of the crisis is opportunity in Chinese language. If 64.4% of the participants thought so it gives at least symptoms of over-optimism of individual investors despite the difficulty of measuring it.

5.3.2.3. Statements related with the illusion of control bias

Average Mean:3.53

Table 5.14: As long as I manage my investment myself, my likelihood of winning in the stock market increases (Statement 5).

	Frequency	Percent
Strongly disagree	1	,7
Disagree	10	7,4
Neither agree nor disagree	31	23,0
Agree	70	51,9
Strongly agree	23	17,0
Total	135	100,0

Mean: 3,77

Table 5.15: I easily foresee that the stock market is about to decline and sell my stocks (Statement 20).

	Frequency	Percent
Strongly disagree	3	2,2
Disagree	31	23,0
Neither agree nor disagree	47	34,8
Agree	32	23,7
Strongly agree	22	16,3
Total	135	100,0

Mean: 3,29

According to Odean (1998), especially overconfident investors prefer active management because they overestimate their ability. Thus, if investors suffer from the illusion of control bias, they probably prefer to manage their trading capabilities rather than to use the help of brokerage house, or money managers. The given answers to statement 5 confirmed our opinions. 68.9% of respondents thought that their likelihood of winning in the stock market is increasing as long as they manage their investments themselves. Only 8.1% of them did not think so.

When we look at statement 20, an illusion of control bias which is suffered by the individual investors is seen again, that is, 40% thought they can easily realize that the stock market is about to decline and sell their stocks whereas 25.2% did not think so.

5.3.2.4. Statements related with the illusion of knowledge bias

Average Mean:3.55

Table 5.16: The more information about a specific stock I have, the better it is (Statement 25).

	Frequency	Percent
Strongly disagree	4	3,0
Disagree	17	12,6
Neither agree nor disagree	30	22,2
Agree	56	41,5
Strongly agree	28	20,7
Total	135	100,0

Mean: 3,64

Table 5.17: In any condition, I am able to acquire all information that I need when making investment decisions (Statement 8).

	Frequency	Percent
Strongly disagree	2	1,5
Disagree	26	19,3
Neither agree nor disagree	28	20,7
Agree	65	48,1
Strongly agree	14	10,4
Total	135	100,0

Mean: 3,47

People tend to believe that the more information they have, the more accurate their forecast or investment decisions (Montier, 2002). However, frequently more information does not help individual investors to make better investment decisions because of the narrow framing and the lack of professional education. 62.2% of the respondents thought that more information is better and probably increases the accuracy of their investment decisions. The illusion of knowledge bias can also be observed in statement 8. 58.5% of survey participants were sure that in all conditions they are able to acquire complete information when making investment decisions whereas 20.7% were not sure.

5.3.2.5. Statements related with self attribution bias

Average Mean: 3.04

Table 5.18: I win in the stock market when I don't take brokerage houses' / analysts' advises into account (Statement 14).

	Frequency	Percent
Strongly disagree	5	3,7
Disagree	35	25,9
Neither agree nor disagree	59	43,7
Agree	27	20,0
Strongly agree	9	6,7
Total	135	100,0

Mean: 3,00

Table 5.19: The increase in the value of my stocks may be due to luck rather than to my own ability (Statement 30).

	Frequency	Percent
Strongly disagree	9	6,7
Disagree	40	29,6
Neither agree nor disagree	46	34,1
Agree	33	24,4
Strongly agree	7	5,2
Total	135	100,0

Mean: 2,92

According to Hirshleifer (2001), people have a tendency to attribute success to their own ability, but they tend to blame external factors for their failures. With the logic of this it was given one direct statement and one indirect statement to the participants. Statement 14 was directly given in order to find out whether they suffer from the self attribution bias or not. If the investors attribute winning in the stock market to their abilities and attribute losing to the brokerage house / analysts' advices, they may answer "agree" or "strongly agree". However, only 26.7% suffered from the self attribution bias whereas 29.6% did not and 43.7% were neither agree nor disagree. As seen in Table 5.18, the majority remain undecided. Statement 30 was given with the purpose of confirming the answers to statement 14. There was a reverse logic in this statement. This time they

may say "disagree" or "strongly disagree" if they suffer from the self attribution bias.

As seen in Table 5.19, 36.3% thought that the reason of the increase in the value of their stock is due to their own ability. 29.6% thought it may be due to luck, while 34.1% were neither agree nor disagree. There was a slight increase observed in the self attribution behavior; however, the picture was not clear because the given answers are too close to each other.

5.3.2.6. Statements related with the conservatism bias

Average Mean:3.64

Table 5.20: If I believe in my investment strategy, I do not give much credit to the confusing new information (Statement 7).

	Frequency	Percent
Strongly disagree	3	2,2
Disagree	20	14,8
Neither agree nor disagree	28	20,7
Agree	51	37,8
Strongly agree	33	24,4
Total	135	100,0

Mean:3,67

Table 5.21: We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline (Statement 23).

	Frequency	Percent
Strongly disagree	7	5,2
Disagree	20	14,8
Neither agree nor disagree	21	15,6
Agree	58	43,0
Strongly agree	29	21,5
Total	135	100,0

Mean: 3,61

The conservatism bias refers to the investors' too slow updating of their beliefs in response to recent evidence (Barberis et al., 1998). Two statements were given in order to find out whether they are trapped by the

status quo or not. The aim was to test the investors' belief that the new information is temporary and sticking to the previous forecasts is a better choice. As seen in Table 5.20, 62.2% of the participants do not give much credit to the confusing new information when they believed that their investment strategy is very stable. Only 17% of them responded that they may not have a stable strategy and may change their investment decisions with the help of the new information.

We see the same results when the same type of statement was given in a different, but this time in more direct way. As seen in Table 5.21, 64.4% of the participants avoid changing their investment decision because they believe that their investment strategy is very stable, preferring to do nothing even if their stocks start to decline. Only 20% of them responded that they may reevaluate their original investment strategy when a specific stock which they strongly believed will increase starts to decline.

Of course, investors might not want too many changes in their investment strategies in order to be consistent. However, if the investors have blind confidence that their investment strategy is very stable, they often remain indifferent to the evidences contrary to their hypothesis and do not change their plans easily despite the new findings. As can be understood from the responses, investors have strong belief in their original investment strategies. The possible reasons may either be because investors exaggerate their trading skills or their desire for protecting egos from criticism and to avoid regretting, or because the evaluation of the various investment alternatives needs extra effort. Whatever the reason, investors remain conservative and trapped by the status quo.

5.3.2.7. Statements related with the confirmation bias

Average Mean: 3.60

Table 5.22: The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy (Statement 29).

	Frequency	Percent
Strongly disagree	3	2,2
Disagree	13	9,6
Neither agree nor disagree	24	17,8
Agree	78	57,8
Strongly agree	17	12,6
Total	135	100,0

Mean: 3,69

Table 5.23: I realize that I am on the right track to invest if the investments of the people whose opinions I value are similar to mine (Statement 4).

	Frequency	Percent
Strongly disagree	6	4,4
Disagree	19	14,1
Neither agree nor disagree	29	21,5
Agree	63	46,7
Strongly agree	18	13,3
Total	135	100,0

Mean:3,50

People feel good to hear opinions similar to their own from other people and seek confirmatory information and overweigh the accuracy and reliability of the confirming evidence in order to protect their self-esteem (Montier, 2002; Rabin et al., 1999; Hirshleifer, 2001). As seen in Table 5.22, 70.4% of the participants declared that their plan to buy a specific stock is affected by the positive news in the written and visual media. Only 11.9% of them thought that their investment decisions are not affected by the related news in the media.

Investors pay more attention to the trading activities of other investors which parallel theirs in order to give more credit to their investing skills. From this point of view, as seen in Table 5.23, it was asked if they realize

that they are on the right track to invest if the investments of the people whose opinions they value are similar to theirs. 60% thought they are on the right track if the investments of the people whose opinions they value are similar to their while only 18.5% did not think so. It is understood from both statements that investors have tendency to consider the news, evidence and the similar trading activities of other investors in confirmation with their own strategies and beliefs.

5.3.2.8. Statements related with the hindsight bias

Average Mean: 3.15

Table 5.24: It was clear that the oil prices would not keep their high levels (Statements 9).

	Frequency	Percent
Strongly disagree	9	6,7
Disagree	34	25,2
Neither agree nor disagree	44	32,6
Agree	31	23,0
Strongly agree	17	12,6
Total	135	100,0

Mean: 3,10

Table 5.25: It was clear that the foreign investors will sell their portfolio investments and leave the country (Statement 31).

	Frequency	Percent
Strongly disagree	10	7,4
Disagree	32	23,7
Neither agree nor disagree	29	21,5
Agree	50	37,0
Strongly agree	14	10,4
Total	135	100,0

Mean: 3,19

The *hindsight* bias refers to people's thoughts that they could predict certain events before their occurrence, sometimes called as *"I knew it all along"* effect (Hawkins, 1990). Because it is easy to look back at certain event in the past and think it can be predictable (Montier, 2002). Two statements were given regarding the oil prices and the effect of the global crisis to the

ownership structure of the Turkish Financial Markets. The historical oil prices were around 30-40$ during the survey period while they were around 130-140$ six months ago, and around 80-90$ one year ago. Almost no one has claimed that the oil prices will decrease from 130-140$ to 30-40$ levels in June 2009 when historical oil prices reached its peak levels. As seen in Table 5.24, 35.6% of the participants replied that they predicted that the oil prices would not keep their high levels in an environment where predicting the level of oil prices is very difficult. 31.9% of them responded that they did not predict it and 32.6% of them remained undecided.

Another statement about the hindsight bias is related indirectly with the effect of the recent economic crisis to the Turkey. We have been seeing a lot of expert opinions that the 2001 crisis in Turkey and recent global crisis would certainly be predictable. It was clear that the foreign investors sell their portfolio investments and leave the country means that the crisis would happen in any case, because in every crisis, whether local or global, the foreign investors sell their portfolio investments in Turkey and leave the country partially or wholly. As seen in Table 5.25, 47.4% of the participants thought that it was clear that the foreign investors will sell their portfolio investments and leave the country, whereas 31.1% did not think so. The strongly agree and agree ratio is high compared to the statement about the oil prices; however, still disagree and strongly disagree side remain at 31.1% just as the first hindsight bias statement.

The results show that there is no common tendency of the participants to have hindsight bias about the level of the oil prices, but they have slight tendency about the prediction of foreign ownership of the Turkish Financial Market structure and thus about the effect of the global crisis on Turkey.

5.3.2.9. Statement related with the cognitive dissonance

Table 5.26: Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency (Statement 12).

	Frequency	Percent
Strongly disagree	3	2,2
Disagree	21	15,6
Neither agree nor disagree	34	25,2
Agree	61	45,2
Strongly agree	16	11,9
Total	135	100,0

Mean: 3,49

According to Nofsinger (2008) and Shiller (1998), investors seek to eliminate cognitive dissonance especially for the success of the investment choices in the past because they have a tendency to believe that their investment decisions were good.

For investors, a cognitive dissonance does occur when their portfolio starts to decline. Thus, they have to resolve or reduce the dissonance in order to protect their self-confidence about their trading skills. Hence, the statement "because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency" is given related with cognitive dissonance. The logic behind this statement is to find out whether the investors choose to resolve the dissonance between their unsuccessful trading activities and their judgment about competency of their decisions. As seen in Table 5.26, 57% of the participants thought that the unsuccessful trading activities in crisis times do not imply the investor's incompetency because it is hard to predict the timing of the crisis, whereas only 17.8% did not think so. That is, the majority of the participants chose to resolve the dissonance by attributing the losses to the market conditions rather than to a defect in their trading skills.

On the other hand, one may think that it is extremely difficult to forecast the timing of the crisis. However, it is expected from a master captain to show his ability in the wavy sea. It can be said that 43.7% of the participants see themselves as a master or very experienced captain in trading by evaluating statement 17 ("my ability to pick the stock is above

that of an average investor") about the overconfidence bias. Moreover, if we re-evaluate statement 30 ("the increase in the value of my stocks may be due to luck rather than to my own ability") about the self-attribution bias, 36.3% of the participants thought the reason of the increase in the value of their stock may be due to their own ability, whereas only 29.6% think it may be due to luck.

To sum up, investors thought that they have superior trading skills; on the other hand, if they have unsuccessful trading activities they have to resolve this psychologically uncomfortable dissonance in order to protect their self-esteem.

5.3.2.10. Statements related with the salience – availability - cue competition

Average Mean: 3,17

Table 5.27: A company's stock about which the media often make news should be preferred when investing (Statement 16).

	Frequency	Percent
Strongly disagree	7	5,2
Disagree	56	41,5
Neither agree nor disagree	41	30,4
Agree	26	19,3
Strongly agree	5	3,7
Total	135	100,0

Mean: 2,75

Table 5.28: Expert opinions in written and visual media should be taken into consideration when investing (Statement 3).

	Frequency	Percent
Strongly disagree	2	1,5
Disagree	17	12,6
Neither agree nor disagree	32	23,7
Agree	69	51,1
Strongly agree	15	11,1
Total	135	100,0

Mean: 3,58

As emphasized in detail in the behavioral approach section, the salience, cue-competition and the availability heuristics are mechanisms which are often used in the decision process generally refer to people's tendency to use more obvious and familiar data when making a decision (Oran, 2008).

Two statements were given regarding the salience, cue-competition and the availability heuristics. First one (statement 16) was "a company's stock about which the media often make news should be preferred when investing". It is no doubt that companies about which the media often make news become salient in our mind. The mission of this question is to find out whether these salient, or vivid, cues affect the trading decisions of the investors or not. Surprisingly, as seen in Table 5.27, only 23% of the participants responded that they should not prefer to invest in that company's stock about which the media makes more news compared to the others. Moreover, a total of 46.7% either disagreed (41.5%) or Strongly disagreed (5.2%). When evaluating the responses, two more points seem to be noteworthy. First, the "Strongly disagree" ratio is too low compared to the "disagree" ratio and the second, 30.4% "neither agree nor disagree" ratio.

It was observed that the individual investors usually consider expert opinions in investing more heavily than their own opinions during the preparation phase of the survey. When the reason for this was questioned, they replied as they can easily learn and remember the overall outlook of the financial markets and some specific investing instruments with the help of the trading gurus' advises. What is learned from their investing behaviors is that the expert opinions become a kind of salient information. Thus, it was decided to give statement "expert opinions in written and visual media should be taken into consideration when investing" concerning with the salience, cue-competition and the availability heuristics. As seen in Table 5.28, 62.2% of the indicated agreement (51.1%) and strongly agreement (11.1%) while only 14.1% disagreed (12.6%) and strongly disagreed (1.5%) with idea that expert opinions in written and visual media should be taken into consideration when investing. No doubt there may be other consequences such as imitation, social contagion and herd behavior if such numbers of individual investors consider expert opinion more or less at the same time.

5.3.2.11. Statements related with representativeness

Average Mean: 3,49

Table 5.29: A good company's stock is a good stock (Statement 2).

	Frequency	Percent
Strongly disagree	10	7,4
Disagree	24	17,8
Neither agree nor disagree	22	16,3
Agree	55	40,7
Strongly agree	24	17,8
Total	135	100,0

Mean: 3,44

Table 5.30: The past return performance of a stock provides information about its future performance (Statement 18).

	Frequency	Percent
Strongly disagree	2	1,5
Disagree	27	20,0
Neither agree nor disagree	26	19,3
Agree	58	43,0
Strongly agree	22	16,3
Total	135	100,0

Mean: 3,53

As exhibited in the behavioral approach section, investors confuse good firms with good investments and, moreover, they believe that the past return performance of the stock is a main indicator for its future path (Nofsinger, 2005). Thus it was decided to investigate these facts and beliefs as the statements concerning with representativeness heuristics.

Whether a good company's stock is a good stock or not is very controversial. Some support this idea while many others oppose it. According to Nofsinger (2005), who is one of the important opponents, a company’s quality is determined by looking at many indicators. Among these are strong earnings, high sales, quality management, etc. On the other hand, good investment occurs only when our stock’s price increases more than others.

Our individual investors' replies are seen in Table 5.30. 58.5% of the participants believed that a good company's stock is a good stock while only 25.2% disagreed and 16.3% remained neither agree nor disagree. The picture is clear that the participants have a tendency to believe that a good company's stock is a good stock whatever the motivation behind it.

Another statement regarding representativeness is about the past performance of the stock. This is extremely important because if the investors believe that the past return performance of a stock provides information about its future performance, this basically causes a trend chasing and an overreaction as Hirshleifer (2001) and Barberis et al., (1998) claimed.

The results are seen in Table 5.30. 59.3% of the participants believed in this notion, whereas 21.5% did not believe and 19.3% of them remained indifferent or could not decide. The picture is more or less the same as the previous statement. They strongly tend to believe that the past return performance of a stock provides information about its future performance which violates the main features of the weak-form of market efficiency. This belief may be a one of the meaningful explanations for the reasons of observed overreaction and bubbles in markets.

5.3.2.12. Statements related with mental accounting

Average Mean: 3,33

Table 5.31: If the actual price of the stock decreases to below its purchasing price, it should be held until it breaks even (Statements 13).

	Frequency	Percent
Strongly disagree	19	14,1
Disagree	34	25,2
Neither agree nor disagree	29	21,5
Agree	36	26,7
Strongly agree	17	12,6
Total	135	100,0

Mean: 2,99

Table 5.32: We have to diversify our investments by distributing them equally among the instruments which are being considered (Statements 28).

	Frequency	Percent
Strongly disagree	8	5,9
Disagree	17	12,6
Neither agree nor disagree	17	12,6
Agree	62	45,9
Strongly agree	31	23,0
Total	135	100,0

Mean: 3,67

Table 5.33: The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains (Statements 15).

	Frequency	Percent
Strongly disagree	5	3,7
Disagree	26	19,3
Neither agree nor disagree	32	23,7
Agree	55	40,7
Strongly agree	17	12,6
Total	135	100,0

Mean: 3,39

Table 5.34: The losses in bonds and bills create sadness to people more than the same amount of losses in stock because bonds and bills are less risky (Statement 26).

	Frequency	Percent
Strongly disagree	8	5,9
Disagree	27	20,0
Neither agree nor disagree	35	25,9
Agree	51	37,8
Strongly agree	14	10,4
Total	135	100,0

Mean: 3,27

Mental accounting is the set of cognitive operations used by individuals to organize, evaluate, and keep track of financial activities which can be balanced daily, weekly, monthly, and can influence the choices. (Thaler, 1999; pp.183).

One of the most important impacts of mental accounting is the disposition effect (Kahneman et al., 1998; Thaler, 1999; Grinblatt et al., 2004). Shefrin and Statman (1985) asserted the disposition effect as investors' tendency to sell the "winning stocks" too soon and to hold "losing stocks" too long or avoid selling them. Thus, they choose to wait for the reversal of the downward stock's price to up through at least their purchase price because they take the purchase price as a reference point and use it in order to assess the outcomes as gains and losses (Kahneman et al., 1998). However, Table 5.31 offers a blurred picture about the disposition effect. 39.3% of the participants approve this idea, where as interestingly exactly 39.3% disapprove and 21.5% remain undecided.

We have been seeing many experts' advice that if the actual price of the stock decreases below its purchased price, it should not be held until it reaches its original purchase price. They labeled this avoidance of the disposition effect as "stop-loss". It can be said that nearly all of the investors, even individual novices, are aware of this fact.

Another effect of mental accounting is naïve diversification (Thaler, 1999). For example, when investors face N choices from the possible investment alternatives, they follow 1/N rule to allocate their resources equally through possible options (Benartzi et al., 2001). Thus, the statement "we have to diversify our investments by distributing them equally among the instruments which are being considered" was given in order to test this claim. As seen in Table 5.32, totally 68.9% of the participants strongly agree (23%) and agree (45.9%) that to follow 1/N rule is better choice, whereas only 18.5% did not think so and 12.6% of them remain undecided.

The picture from the responses of the participants tell us that the investors segregate each investment alternative into different mental accounts and ignore the correlation among the instrument which mainly violates the third feature of the modern portfolio theory consistent with the common claims of Thaler (1999), Benartzi et al., (2001) and Nofsinger (2008) as exhibited in the behavioral approach section.

According to Tversky and Kahneman (1992), people suffer doubly more pain in case of loss compared to the pleasure of winning, thus, they become loss averse. Loss aversion leads people to segregate each investment in terms of gains and losses, in turn causing mental accounting as exhibited in the prospect theory section. With this motivation and to test whether 1$ is equal to another 1$ in the investor's mind, statements 15 "the sadness resulting from losses in investments have relatively greater impact on people than the joy resulting from gains" was given. As seen in Table 5.33, 53.3% of the participants confirmed that they strongly agree (12.6%) and agree (40.7%), whereas a total of 23% of them disagree and/or strongly disagree and 23.7% remain undecided.

The responses confirmed Kahneman and Tversky (1979)'s prospect theory's fundamental tenet; that is, the psychological and emotional impacts of losses are greater than that of the gains.

Recall from the market anomalies and behavioral approach sections, the equity premium puzzle refers to the individuals' tendency to view the bond's yield as being higher than the stock's return, despite the fact that stocks outperformed bonds with a high margin. This can be explained by narrow framing and loss aversion which known as myopic loss aversion (Barberis et al., 2006; Mehra et al., 1985). Furthermore, narrow framing and loss aversion are the central themes of the prospect theory, in fact, of mental accounting. With this purpose and to test the equity premium puzzle and the myopic loss aversion, statement 26 "the losses in bonds and bills create sadness to people more than the same amount of losses in the stock because bonds and bills are less risky" was given as a last statement regarding to mental accounting.

The results are seen in Table 5.34. Totally 48.2% of the participants strongly agree (10.4%) and agree (37.8%), whereas a total of 25.9% disagree and strongly disagree and again 25.9% remain undecided on whether the impact of the losses in the bonds and bills are higher than same amount of losses in the stock or not.

As exhibited earlier, the presentation of the decision problem could lead to a deviation from rational behavior. If we did not add the idea that "because bonds and bills are less risky" to the statement, it is probable that the 48.2% of the strongly agree and agree ratio will be reduced. However, the

1$ loss is always equal to another 1$ loss no matter which investment instruments cause these losses. But as stated, individuals' accounting system is somewhat psychological and they segregate different costs into different mental accounts and they weigh these different accounts by looking at the effects of the costs.

The equity premium puzzle and the myopic loss aversion are also related to the *ambiguity aversion* behavior that we emphasize later.

5.3.2.13. Statements related with mood

Average Mean: 2,99

Table 5.35: The investor is more optimistically inclined to buy the stocks of his favorite team when they win, and more pessimistic when they lose (Statement 27).

	Frequency	Percent
Strongly disagree	13	9,6
Disagree	21	15,6
Neither agree nor disagree	50	37,0
Agree	37	27,4
Strongly agree	14	10,4
Total	135	100,0

Mean: 3,13

Table 5.36: The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments (Statement 32).

	Frequency	Percent
Strongly disagree	22	16,3
Disagree	37	27,4
Neither agree nor disagree	27	20,0
Agree	39	28,9
Strongly agree	10	7,4
Total	135	100,0

Mean: 2,84

The people's choices under uncertainty especially for the future prospects can be affected by the mood which they are in. People are optimistic if they are in good (happy) mood, and they are pessimistic if they are in bad (sad)

mood (Wright et al., 1992). For example, the national flag sales were boosted after the victory of the Turkish national soccer team in 2002 World Cup.

Statement 27 "the investor is more optimistically inclined to buy the stocks of his favorite team when they win, and more pessimistic when they lose" was given in order to test the relationship between the investors' mood and their buying behavior. The logic behind choosing the soccer teams' victories or defeats as a statement subject is the observed rise in the value of the big soccer teams' stocks in ISE after their victory. Of course, there may be various explanations for this; however, consistent with our research topic, we tried to test its psychological dimension.

As seen in Table 5.35, 37.8% of the participants confirmed, whereas 25.2% of them disconfirmed, and 25.2% of them remain undecided on whether the mood of the investors affects their purchase of their favorite soccer team stocks after their victory. Unfortunately, the participants' responses did not give us a clear picture; therefore, we did not reach a definite conclusion about the relationship between the investors' mood and their buying behavior.

We suffered a big global crisis in the research period. The written and the visual media are dominated by the news and articles about the crisis. Some said the crisis is exaggerated; moreover, the impact of the crisis will be higher because the mood of the people is affected with this intense discourse about the crisis. They gave an example of some observed immediate reservation cancellations just after the terrorist attack in Antalya or somewhere else. Moreover, they claim that the effect of the rumors of crisis in written and visual media is like a terrorist attack. Like a tourist who is afraid of traveling to an area which is attacked by the terrorist, people will be afraid; in fact, they have a tendency to sell their investments because of these rumors. Thus, statement 32, "the rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments" was given in order to test this idea. As seen in Table 5.36; a total of 36.3% of the participants strongly agree (7.4%) and agree (28.9%), whereas a total of 43.7% disagree (27.4%) and strongly disagree (16.3%), and 20% of them remain undecided on whether the rumors of crisis cause the investor to be inclined towards selling all their investment.

The "agree" and the "disagree" ratios are too close to each other; however, "strongly disagree" ratio is much higher of the "strongly agree" ratio. If we take some part of neither agree nor disagree side into consideration as disapproval, it can be said that the rumors of crisis in written and visual media do not affect and push the investors to the tendency of selling all their investments as it has been argued.

5.3.2.14. Statement related with self control

Table 5.37: When I am in need of money, I spend the incoming dividends instead of selling my stocks (Statement 21).

	Frequency	Percent
Strongly disagree	5	3,7
Disagree	23	17,0
Neither agree nor disagree	27	20,0
Agree	63	46,7
Strongly agree	17	12,6
Total	135	100,0

Mean: 3,47

As exhibited, individuals prefer cash dividends rather than capital gains even though the dividend income is taxed higher than capital gains (Miller, 1986) because they have a tendency to perceive the cash dividend as an income rather than a capital. Moreover, because of the desire not to use or reduce the capital, they prefer cash dividend; therefore, they value the dividends for self-control reasons (Shefrin, 2002, pp.30). To test this view about self-control statement 21 "when I am in need of money, I spend the incoming dividends instead of selling my stocks" was given. The results are seen in Table 5.37. In total 59.3% of the participants agree (46.7%) and strongly agree (12.6%), whereas only 20.7% disagree (17%) and strongly disagree (3.7%), and 20% of them remain undecided on whether they spend incoming dividend instead of selling the stocks when cash is needed. The picture is consistent with literature indicating that individual investors prefer incoming dividend when they are in need of money.

5.3.2.15. Statements related with ambiguity aversion

Average Mean: 2,82

Table 5.38: Some banks and financial institutions may go bankrupt; bank deposits are more risky (Statement 6).

	Frequency	Percent
Strongly disagree	16	11,9
Disagree	52	38,5
Neither agree nor disagree	35	25,9
Agree	20	14,8
Strongly agree	12	8,9
Total	135	100,0

Mean: 2,70

Table 5.39: In the long run, bonds and bills earn more than the average stock (Statement 19).

	Frequency	Percent
Strongly disagree	17	12,6
Disagree	40	29,6
Neither agree nor disagree	29	21,5
Agree	33	24,4
Strongly agree	16	11,9
Total	135	100,0

Mean: 2,93

People dislike uncertainties and they are averse to *ambiguity* especially when there is a lack of information. Moreover, they perceive the ambiguity as a risk and behave irrationally (Hirshleifer, 2001, pp. 1550). However, risk and ambiguity are two different terms. The term "ambiguity" contains the term "risk" and risk refers to *measurable ambiguity*.

During the research period, after the bankruptcy of Lehman Brothers and some other banks in the western countries, it was observed that some individual investors were afraid of bank failures. Moreover, these fears were increasing because some foreign capital dominated banks' headquarters abroad were dealing with the global crisis and were requesting financial help from their governments. As a matter of fact, it is very natural for the

individual investors to have this kind of fear because, in Turkey, they had witnessed many bank bankruptcies in 2001 and earlier forcing them to be very sensitive even to the rumors of banks' and financial institutions' bankruptcies. Thus, statement 6 "some banks and financial institutions may go bankrupt, bank deposits are more risky" was given in order to test whether the individual investors perceive the rumors of possible bank bankruptcies as an ambiguity, or not. As seen in Table 5.38, only 23.7% of the participants strongly agree (8.9%) and agree (14.8%) and a total of 50.4% of them disagree (38.5%) and strongly disagree (11.9%) that some banks and financial institutions may go bankrupt, and hence it is more risky to deposit, whereas 25.9% remain neither agree nor disagree.

The picture is clear that surprisingly the majority of the individual investors did not believe that banks and financial institutions may go bankrupt despite the global crisis and bad experience of Lehman and others.

Recall from the market anomalies and behavioral approach sections that the equity premium puzzle refers to the individuals' tendency to view the bond's yield as being higher than the stock's return, despite the fact that stocks outperformed bonds with a high margin. This can be explained by narrow framing and loss aversion which are known as myopic loss aversion (Barberis et al., 2006; Mehra et al., 1985). In earlier pages of this research, the equity premium puzzle was tested with the mental accounting view, and this time statement 19 "in the long run, bonds and bills earn more than the average stock" was given in order to test it with the ambiguity aversion view.

As seen in Table 5.39, totally 36.3% of the participants strongly agree (11.9%) and agree (24.4%), and totally 42.2% disagree (29.6%) and strongly disagree (12.6%) with the idea that, in the long run, bonds and bills earn more than the average stock and 21.5% remain neither agree nor disagree. Surprisingly, the majority of participants responded contrary to the Mehra and Prescott (1985)'s findings.

5.3.2.16. Statements related with social contagion, imitation and the herd behavior

Average Mean: 3,27

Table 5.40: The most successful investment tactic is to copy the successful investment tactics of the successful traders (Statement 22).

	Frequency	Percent
Strongly disagree	8	5,9
Disagree	36	26,7
Neither agree nor disagree	41	30,4
Agree	41	30,4
Strongly agree	9	6,7
Total	135	100,0

Mean: 3,05

Table 5.41: Those who follow foreign / institutional investors at stock market win (Statement 11).

	Frequency	Percent
Strongly disagree	3	2,2
Disagree	30	22,2
Neither agree nor disagree	25	18,5
Agree	53	39,3
Strongly agree	24	17,8
Total	135	100,0

Mean: 3,48

According to Hirshleifer and Teoh (2003) the immediate rise in the stock or commodity which is bought by Warren Buffet is the best example for imitation. Thus, statement 22, "the most successful investment tactic is to copy the successful investment tactics of the successful traders" was given concerning with imitation. As seen in Table 5.40, totally 37% of the participants strongly agree (6.7%) and agree (30.4%), and totally 32.6% of them disagree (26.7%) and strongly disagree (5.9%) that the most successful investment tactic is to copy the successful investment tactics of the successful traders, 30.4% remain neither agree nor disagree. The

responses did not give a clear picture because the ratios were too close to each other.

As stated, herd behavior can be defined as the correlated behavior patterns across individuals; that is, everyone doing what everyone else is doing, even when their private information suggests doing something quite different (Devenow and et al., 1996, pp. 604; Banerjee, 1992, pp. 798).

As a matter of fact, trading often becomes too costly and time consuming for the individual investors if they have limited set of information. They, then, choose to observe others in order to review the alternatives because of the difficulty of reaching the information. Sooner or later this observation causes to ignore their own private information and act on the basis of others' information which Bikhchandani and et al., called *informational cascades*.

It is observed that the majority of the individual investors have educational problem about the nature of investing facilities. Moreover, they have hearsay information about the dynamics and the mechanisms of the financial markets. However, to reach the relevant information about financial markets and some statistical data is hard in Turkey. Information can be utilized by the public after the privileged institutional investors or insider usage. Therefore, individual investors always board the train from the last wagon. Thus, statement 11 "those one who follow the foreign / institutional investors at stock market wins" was given regarding the herd behavior. As seen in Table 5.41, totally 57% of the participants strongly agree (17.8%) and agree (39.3%), and a total of 24.4% disagree (22.2%) and strongly disagree (2.2%) that one who follows the foreign / institutional investors at stock market win, whereas 18.5% remain neither agree nor disagree. The responses of the participants clearly verified a well-known fact for the ISE. That is, the foreign / institutional investors always board the train first and set the direction of the herd behavior.

A further analysis of behavioral statements sorted according to their mean values is given in Table 5.42.

Table 5.42: Behavioral biases sorted according to their average mean values and relevant statements.

Statement Number	STATEMENTS	Average Mean	Related to
7	If I believe in my investment strategy, I do not give much credit to the confusing new information.	3,64	Conservatism
23	We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline.		
4	I realize that I am on the right track to invest if the investments of the people whose opinions I value are similar to mine.	3,60	Confirmation
29	The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy.		
8	In any condition, I am able to acquire all information that I need when making investment decisions.	3,55	Illusion of knowledge
25	The more information about a specific stock I have, the better it is.		
5	As long as I manage my investment myself, my likelihood of winning in the stock market increases.	3,53	Illusion of control
20	I easily foresee that the stock market is about to decline and sell my stocks.		
12	Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency.	3,49	Cognitive dissonance
2	A good company's stock is a good stock.	3,49	Representativeness
18	The past return performance of a stock provides information about its future performance.		
21	When I am in need of money, I spend the incoming dividends instead of selling my stocks.	3,47	Self control
10	Once the stock market indices start to rise, I think they will continue to increase in the future as well.	3,35	Over-optimism
24	The chaos created by a crisis is a thin veil hiding great opportunities.		
1	I find winning stocks even when the stock markets decline.	3,33	Overconfidence
17	My ability to pick the stock is above that of the average investor		
13	If the actual price of the stock decreases to below its purchasing price, it should be held until it breaks even.	3,33	Mental accounting
15	The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains.		
26	The losses in bonds and bills create sadness to people more than the same amount of losses in stock because bonds and bills are less risky.		
28	We have to diversify our investments by distributing them equally among the instruments which are being considered.		

11	Those who follow foreign / institutional investors at stock market win.	3,27	Social contagion-Imitation-Herd behavior
22	The most successful investment tactic is to copy the successful investment tactics of the successful traders.		
3	Expert opinions in written and visual media should be taken into consideration when investing.	3,17	Salience-Availability-Cue competition
16	A company's stock about which the media often make news should be preferred when investing.		
9	It was clear that the oil prices would not keep their high levels.	3,15	Hindsight
31	It was clear that the foreign investors will sell their portfolio investments and leave the country.		
14	I win in the stock market when I don't take brokerage houses' / analysts' advises into account.	3,04	Self attribution
30	The increase in the value of my stocks may be due to luck rather than my own ability.		
27	The investor is more optimistically inclined to buy the stocks of his favorite team when they win, and more pessimistic when they lose.	2,99	Mood
32	The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments.		
6	Some banks and financial institutions may go bankrupt; bank deposits are more risky.	2,86	Ambiguity aversion
19	In the long run, bonds and bills earn more than the average stock.		

There are numerous findings about behavioral deficiencies of individual investors, mostly parallel to the findings of previous research. As seen in Table 5.42, biases categorized under self deception have stronger impacts and therefore investors are suffering from their cognitive disabilities. However, this should not be perceived as a negative aspect. Human beings have survival objective and these biases may contribute to this end.

5.3.3. Analysis of Demographic Factors versus Behavioral Statements

The purpose of this section is to find out the relationship between the demographic questions and the behavioral statements. Consistent with this purpose, the Kolmogorov-Smirnov one-sample goodness of fit test is conducted in order to use either parametric or non-parametric test. As stated earlier, according to Siegel and Castellan (1998, pp. 54-55) the Kolmogorov-Smirnov test is the more powerful to test the goodness of fit. Two tailed test is selected because the answers have both positive (agree) and negative (disagree) sides.

According to the test results, none of the thirty-two statements have either asymptotic or exact p values greater than 0.001 showing that the null hypothesis of normally distributed answers is rejected at the 99% confidence level. Thus, chi-square which is one of the most used non-parametric tests is chosen.

The "strongly agree", "agree", "neither agree nor disagree", "disagree", and "strongly disagree" five-point Likert scale was transformed into three-point Likert scale as "strongly agree plus agree", "disagree plus strongly disagree" and "neither agree nor disagree" in order to obtain more meaningful results. All of the relationships between nine demographic question and thirty-two behavioral statements were searched in chi-square using SPSS version 15, those exhibiting a statistically significant relationship at 95% or 99% confidence level are given in Table 5.43.

Table 5.43: The relationship between demographic factors and behavioral biases.

Demographic factors vs. Behavioral biases	**STATEMENTS**	**Exact p values**
Age & Overconfidence	S1 (I find winning stocks even when the stock markets decline)	0,020*
Age & Representativeness	S2 (A good company's stock is a good stock)	0,014*
Age & Salience-Availability-Cue Competition	S16 (A company's stock about which the media often make news should be preferred when investing)	0,021*

Age & Self Control	S21 (When I am in need of money, I spend the incoming dividends instead of selling my stocks)	0,018*
Gender & Illusion of Control	S5 (As long as I manage my investment myself, my likelihood of winning in the stock market increases)	0,024*
Gender & Hindsight	S9 (It was clear that the oil prices would not keep their high levels)	0,016*
Gender & Herd Behavior	S11 (Those who follow foreign / institutional investors at stock market win)	0,002*
Gender & Overconfidence	S17 (My ability to pick the stock is above that of the average investor)	0,011*
Gender & Imitation	S22 (The most successful investment tactic is to copy the successful investment tactics of the successful traders)	0,000**
Gender & Conservatism	S23 (We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline)	0,019*
Gender & Over-optimism	S24 (The chaos created by a crisis is a thin veil hiding great opportunities)	0,009*
Gender & Illusion of Knowledge	S25 (The more information about a specific stock I have, the better it is)	0,015*
Gender & Mood	S32 (The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments)	0,047*
Education & Ambiguity Aversion	S6 (Some banks and financial institutions may go bankrupt; bank deposits are more risky)	0,000**
Education & Illusion of Knowledge	S8 (In any condition, I am able to acquire all information that I need when making investment decisions)	0,033*
Education & Cognitive Dissonance	S12 (Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency)	0,007*
Education & Representativeness	S18 (The past return performance of a stock provides information about its future performance)	0,046*
Education & Illusion of Control	S20 (I easily foresee that the stock market is about to decline and sell my stocks)	0,038*
Education & Mental Accounting	S28 (We have to diversify our investments by distributing them equally among the instruments which are being considered)	0,029*
Education & Confirmation	S29 (The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy)	0,004*

Income & Conservatism	S23 (We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline)	0,033*
Marital Status & Salience-Availability-Cue Competition	S3 (Expert opinions in written and visual media should be taken into consideration when investing)	0,041*
Marital Status & Hindsight	S9 (It was clear that the oil prices would not keep their high levels)	0,017*
Marital Status & Mental Accounting	S15 (The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains)	0,004*
# of Dependents & Hindsight	S9 (It was clear that the oil prices would not keep their high levels)	0,007*
# of Dependents & Cognitive Dissonance	S12 (Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency)	0,022*
# of Firms' Stock in Portfolio & Hindsight	S9 (It was clear that the oil prices would not keep their high levels)	0,037*
# of Firms' Stock in Portfolio & Mental Accounting	S28 (We have to diversify our investments by distributing them equally among the instruments which are being considered)	0,049*
Investment Experience & Mental accounting	S13 (If the actual price of the stock decreases to below its purchasing price, it should be held until it breaks even)	0,000**
Investment Experience & Conservatism	S23 (We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline)	0,016*
% invested in stocks & Overconfidence	S1 (I find winning stocks even when the stock markets decline)	0,009*
% invested in stocks & Herd Behavior	S11 (Those who follow foreign / institutional investors at stock market win)	0,046*
% invested in stocks & Illusion of Control	S20 (I easily foresee that the stock market is about to decline and sell my stocks)	0,021*
% invested in stocks & Conservatism	S23 (We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline)	0,029*
% invested in stocks & Mental Accounting	S28 (We have to diversify our investments by distributing them equally among the instruments which are being considered)	0,027*
% invested in stocks & Confirmation	S29 (The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy)	0,018*

*Significant at 95% confidence level ** Significant at 99% confidence level

Detailed analysis for the relationships between demographic factors and behavioral biases that are meaningful at 5% or 1% significance level are given in the following section. Therefore, H0's that denoting there exists no relationship between the variables are rejected.

5.3.3.1. Age versus Behavioral Statements

Table 5.44: The cross tabulation of age groups and the responses to statement 1 "I find winning stocks even when the stock markets decline" (overconfidence).

			I find winning stocks even when the stock markets decline (S1)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Age Group	21-30	Number within age group	7	19	25	51
		% within Age Group	13,7%	37,3%	49,0%	100,0%
		% within S1	22,6%	61,3%	34,2%	37,8%
	31-40	Number within age group	14	8	33	55
		% within Age Group	25,5%	14,5%	60,0%	100,0%
		% within S1	45,2%	25,8%	45,2%	40,7%
	41 and higher	Number within age group	10	4	15	29
		% within Age Group	34,5%	13,8%	51,7%	100,0%
		% within S1	32,3%	12,9%	20,5%	21,5%
Total		Number within age group	31	31	73	135
		% within Age Group	23,0%	23,0%	54,1%	100,0%
		% within S1	100,0%	100,0%	100,0%	100,0%

x^2 = 11,643; df = 4; exact p value = 0,020; significant at 95% confidence level

As seen in Table 5.44, the highest strongly agree + agree (hereafter approval) rate (45.2%) is in the age group between 31 and 40 whereas the lowest one (20.5%) is in the age group between 41 and higher. The highest disagree + agree (hereafter disapproval) rate (45.2%) is in the age group between 31 and 40 while the lowest one (22.6%) is in the age group between 21 and 30.

On the other hand, when age groups are compared with each other, the highest approval rate is observed in the age group between 31 and 40 (60%) whereas the highest disapproval rate is in the age group between 41 and more.

The members of 31-40 group are the ones that suffer from overconfidence bias the most whereas the 41 and higher age group are the least biased.

Table 5.45: The cross tabulation of age groups and the responses to statement 2 "A good company's stock is a good stock" (representativeness).

			A good company's stock is a good stock (S2)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Age Group	21-30	Number within age group	16	9	26	51
		% within Age Group	31,4%	17,6%	51,0%	100,0%
		% within S2	47,1%	40,9%	32,9%	37,8%
	31-40	Number within age group	16	4	35	55
		% within Age Group	29,1%	7,3%	63,6%	100,0%
		% within S2	47,1%	18,2%	44,3%	40,7%
	41 and higher	Number within age group	2	9	18	29
		% within Age Group	6,9%	31,0%	62,1%	100,0%
		% within S2	5,9%	40,9%	22,8%	21,5%
Total		Number within age group	34	22	79	135
		% within Age Group	25,2%	16,3%	58,5%	100,0%
		% within S2	100,0%	100,0%	100,0%	100,0%

x^2 = 12,434; df =4 ; exact p value = 0,014; significant at 95% confidence level

As seen in Table 5.45, the highest approval rate (44.3%) is in the age group between 31 and 40 whereas the lowest one (22.8%) is in the age group between 41 and higher. The highest disapproval rate (47.1) is shared by the age group 21-30 and 31-40. The lowest one (5.9%) is in the age group between 41 and higher.

On the other hand, when age groups are compared with each other, the highest approval rate is observed in the age group between 31 and 40 (63.6%), but the rate of the 41 and higher age group (62.1%) is too close to the 31-40 age group. Moreover, the lowest disapproval rate is also observed in the 41 and higher age group. The 41 and higher age group's disapproval rates both within the age group itself (6.9%) and within statement 2 (5.9%) are too low compared to the others.

Table 5.46: The cross tabulation of age groups and the responses to statement 16 "A company's stock about which the media often make news should be preferred when investing" (salience-availability-cue competition).

			A company's stock about which the media often make news should be preferred when investing (S16)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Age Group	21-30	Number within age group	22	23	6	51
		% within Age Group	43,1%	45,1%	11,8%	100,0%
		% within s16	34,9%	56,1%	19,4%	37,8%
	31-40	Number within age group	29	11	15	55
		% within Age Group	52,7%	20,0%	27,3%	100,0%
		% within s16	46,0%	26,8%	48,4%	40,7%
	41 and higher	Number within age group	12	7	10	29
		% within Age Group	41,4%	24,1%	34,5%	100,0%
		% within s16	19,0%	17,1%	32,3%	21,5%
Total		Number within age group	63	41	31	135
		% within Age Group	46,7%	30,4%	23,0%	100,0%
		% within s16	100,0%	100,0%	100,0%	100,0%

x^2 = 11,610; df =4 ; exact p value = 0,021; significant at 95% confidence level

As seen in Table 5.46, the highest approval rate (48.4%) is in the age group between 31 and 40 whereas the lowest one (19.4%) is in the age group between 21 and 30. The highest disapproval rate (46%) is in the age group between 31 and 40 whereas the lowest one (19%) is in the age group between 41 and higher.

On the other hand, when age groups are compared with each other, the highest approval rate (34.5%) is observed in the age group between 41 and higher while the lowest one (11.8%) is in the age group between 21 and 30. Even though the highest disapproval rate (52.7%) is observed in the age group between 31 and 40, the disapproval rates are too close to each other.

As demonstrated by the results, age and SAC bias have positive correlation, as subjects' ages increase, they tend to have more SAC bias.

Table 5.47: The cross tabulation of age groups and the responses to statement 21 "When I am in need of money, I spend the incoming dividends instead of selling my stocks" (self control).

			When I am in need of money, I spend the incoming dividends instead of selling my stocks (S21)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Age Group	21-30	Number within age group	5	16	30	51
		% within Age Group	9,8%	31,4%	58,8%	100,0%
		% within S21	17,9%	59,3%	37,5%	37,8%
	31-40	Number within age group	17	8	30	55
		% within Age Group	30,9%	14,5%	54,5%	100,0%
		% within S21	60,7%	29,6%	37,5%	40,7%
	41 and higher	Number within age group	6	3	20	29
		% within Age Group	20,7%	10,3%	69,0%	100,0%
		% within S21	21,4%	11,1%	25,0%	21,5%
Total		Number within age group	28	27	80	135
		% within Age Group	20,7%	20,0%	59,3%	100,0%
		% within S21	100,0%	100,0%	100,0%	100,0%

x^2 = 11,820; df =4 ; exact p value = 0,018; significant at 95% confidence level

As seen in Table 5.47, the highest approve rates (37.5%) are both in the age group between 21 and 30 and between 31 and 40 whereas the lowest one (25%) is in the age group between 41 and higher. The highest disapprove rate (60.7%) is in the age group between 31 and 40 whereas the lowest one (17.9%) is in the age group between 21 and 30.

On the other hand, when age groups are compared with each other, the highest approve rate (69%) is observed in the age group between 41.

5.3.3.2. Gender versus Behavioral Statements

Table 5.48: The cross tabulation of gender and the responses to statement 5 "As long as I manage my investment myself, my likelihood of winning in the stock market increases" (illusion of control).

			As long as I manage my investment myself, my likelihood of winning in the stock market increases (S5)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	6	11	19	36
		% within Gender	16,7%	30,6%	52,8%	100,0%
		% within S5	54,5%	35,5%	20,4%	26,7%
	Male	Number within gender	5	20	74	99
		% within Gender	5,1%	20,2%	74,7%	100,0%
		% within S5	45,5%	64,5%	79,6%	73,3%
Total		Number within gender	11	31	93	135
		% within Gender	8,1%	23,0%	68,9%	100,0%
		% within S5	100,0%	100,0%	100,0%	100,0%

x^2 = 7,454; df =2 ; exact p value = 0,024; significant at 95% confidence level

As seen in Table 5.48, the majority of the participants (79.6%) who suffered from the illusion of control bias are males. Moreover, 74.7% of males are approved statement 5, whereas 52.8% of females are approved it.

On the other hand, the highest disapprove rate (54.5%) is observed among females. Furthermore, 16.7% of females did not approve statement 5 while only 5.1% of males did not approve it.

Table 5.49: The cross tabulation of gender and the responses to statement 9 "It was clear that the oil prices would not keep their high levels" (hindsight).

			It was clear that the oil prices would not keep their high levels (S9)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	11	18	7	36
		% within Gender	30,6%	50,0%	19,4%	100,0%
		% within S9	25,6%	40,9%	14,6%	26,7%
	Male	Number within gender	32	26	41	99
		% within Gender	32,3%	26,3%	41,4%	100,0%
		% within S9	74,4%	59,1%	85,4%	73,3%
Total		Number within gender	43	44	48	135
		% within Gender	31,9%	32,6%	35,6%	100,0%
		% within S9	100,0%	100,0%	100,0%	100,0%

x^2 = 8,174; df =2 ; exact p value = 0,016; significant at 95% confidence level

As seen in Table 5.49, the majority of the participants (85.4%) who suffered from hindsight bias are males. Moreover, 41.4% of males are approved statement 9, whereas 19.4% of females are approved it.

Table 5.50: The cross tabulation of gender and the responses to statement 11 "Those who follow foreign / institutional investors at stock market win" (herd behavior).

			Those who follow foreign / institutional investors at stock market win (S11)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	16	7	13	36
		% within Gender	44,4%	19,4%	36,1%	100,0%
		% within S11	48,5%	28,0%	16,9%	26,7%
	Male	Number within gender	17	18	64	99
		% within Gender	17,2%	18,2%	64,6%	100,0%
		% within S11	51,5%	72,0%	83,1%	73,3%
Total		Number within gender	33	25	77	135
		% within Gender	24,4%	18,5%	57,0%	100,0%
		% within S11	100,0%	100,0%	100,0%	100,0%

x^2 = 11,825; df =2 ; exact p value = 0,002; significant at 95% confidence level

As seen in Table 5.50, the majority of the participants (83.1%) who suffered from herd behavior are males. Moreover, 64.6% of males are approved statement 11, whereas 36.1% of females are approved it.

Table 5.51: The cross tabulation of gender and the responses to statement 17 "My ability to pick the stock is above that of the average investor" (overconfidence)

			My ability to pick the stock is above that of the average investor (S17)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	13	14	9	36
		% within Gender	36,1%	38,9%	25,0%	100,0%
		% within S17	44,8%	29,8%	15,3%	26,7%
	Male	Number within gender	16	33	50	99
		% within Gender	16,2%	33,3%	50,5%	100,0%
		% within S17	55,2%	70,2%	84,7%	73,3%
Total		Number within gender	29	47	59	135
		% within Gender	21,5%	34,8%	43,7%	100,0%
		% within S17	100,0%	100,0%	100,0%	100,0%

x^2 = 9,055; df =2 ; exact p value = 0,011; significant at 95% confidence level

As seen in Table 5.51, the majority of the participants (84.7%) who suffered from overconfidence bias are males. Moreover, 50.5% of males are approved statement 17, whereas 25% of females are approved it.

Table 5.52: The cross tabulation of gender and the responses to statement 22 "The most successful investment tactic is to copy the successful investment tactics of the successful traders" (imitation).

			The most successful investment tactic is to copy the successful investment tactics of the successful traders (S22)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	21	11	4	36
		% within Gender	58,3%	30,6%	11,1%	100,0%
		% within S22	47,7%	26,8%	8,0%	26,7%
	Male	Number within gender	23	30	46	99
		% within Gender	23,2%	30,3%	46,5%	100,0%
		% within S22	52,3%	73,2%	92,0%	73,3%
Total		Number within gender	44	41	50	135
		% within Gender	32,6%	30,4%	37,0%	100,0%
		% within S22	100,0%	100,0%	100,0%	100,0%

x^2 = 18,890; df=2; exact p value = 0,000; significant at 99% confidence level

As seen in Table 5.52, the majority of the participants (92%) who suffered from imitation are males. Moreover, 46.5% of males are approved statement 22, whereas 11.1% of females are approved it.

Table 5.53: The cross tabulation of gender and the responses to statement 23 "We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline" (Conservatism).

			We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline (S23)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	13	5	18	36
		% within Gender	36,1%	13,9%	50,0%	100,0%
		% within S23	48,1%	23,8%	20,7%	26,7%
	Male	Number within gender	14	16	69	99
		% within Gender	14,1%	16,2%	69,7%	100,0%
		% within S23	51,9%	76,2%	79,3%	73,3%
Total		Number within gender	27	21	87	135
		% within Gender	20,0%	15,6%	64,4%	100,0%
		% within S23	100,0%	100,0%	100,0%	100,0%

x^2 = 8,048; df=2; exact p value = 0,019; significant at 95% confidence level

As seen in Table 5.53, the majority of the participants (79.3%) who suffered from conservatism bias are males. Moreover, 69.7% of males are approved statement 23, whereas 50% of females are approved it.

Table 5.54: The cross tabulation of gender and the responses to statement 24 "The chaos created by a crisis is a thin veil hiding great opportunities" (over-optimism).

			The chaos created by a crisis is a thin veil hiding great opportunities (S24)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	10	8	18	36
		% within Gender	27,8%	22,2%	50,0%	100,0%
		% within S24	55,6%	26,7%	20,7%	26,7%
	Male	Number within gender	8	22	69	99
		% within Gender	8,1%	22,2%	69,7%	100,0%
		% within S24	44,4%	73,3%	79,3%	73,3%
Total		Number within gender	18	30	87	135
		% within Gender	13,3%	22,2%	64,4%	100,0%
		% within S24	100,0%	100,0%	100,0%	100,0%

x^2 = 9,271; df=2; exact p value = 0,009; significant at 95% confidence level

As seen in Table 5.54, the majority of the participants (79.3%) who suffered from over-optimism are males. Moreover, 69.7% of males are approved statement 24, whereas 50% of females are approved it.

Table 5.55: The cross tabulation of gender and the responses to statement 25 "The more information about a specific stock I have, the better it is" (Illusion of knowledge).

			The more information about a specific stock I have, the better it is (S25)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	11	6	19	36
		% within Gender	30,6%	16,7%	52,8%	100,0%
		% within S25	52,4%	20,0%	22,6%	26,7%
	Male	Number within gender	10	24	65	99
		% within Gender	10,1%	24,2%	65,7%	100,0%
		% within S25	47,6%	80,0%	77,4%	73,3%
Total		Number within gender	21	30	84	135
		% within Gender	15,6%	22,2%	62,2%	100,0%
		% within S25	100,0%	100,0%	100,0%	100,0%

x^2 = 8,486; df=2; exact p value = 0,015; significant at 95% confidence level

As seen in Table 5.55, the majority of the participants (77.4%) who suffered from the illusion of knowledge bias are males. Moreover, 65.7% of males are approved statement 25, whereas 52.8% of females are approved it.

Table 5.56: The cross tabulation of gender and the responses to statement 32 "The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments" (mood).

			The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments (S32)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Gender	Female	Number within gender	15	12	9	36
		% within Gender	41,7%	33,3%	25,0%	100,0%
		% within S32	25,4%	44,4%	18,4%	26,7%
	Male	Number within gender	44	15	40	99
		% within Gender	44,4%	15,2%	40,4%	100,0%
		% within S32	74,6%	55,6%	81,6%	73,3%
Total		Number within gender	59	27	49	135
		% within Gender	43,7%	20,0%	36,3%	100,0%
		% within S32	100,0%	100,0%	100,0%	100,0%

x^2 = 6,136; df=2; exact p value = 0,047; significant at 95% confidence level

As seen in Table 5.56, the majority of the participants (81.6%) who suffered from mood are males. Moreover, 40.4% of males are approved statement 32, whereas 25% of females are approved it.

The analyses regarding gender vs. behavioral biases are demonstrating interesting results. In all of these analyses, males tend to have more biases than females. Men are more overconfident, conservative, over-optimistic, and moody, have more illusion of control, illusion of knowledge and suffer more from hindsight bias, demonstrate more imitative and herd behavior.
Men suffer illusion of control bias most (74.7%), while least biased as far as mood (40.4%) and hindsight bias (41.4%) are concerned. The differences between the levels (strength) of biases with respect to gender are observed most for imitation, hindsight and overconfidence.

These findings are parallel Barber and Odean (2001), Montier (2002), Nofsinger (2005), Hirshleifer (2001), and Cooper et al., (1998). Of course, it is hard to point out the reasons for above findings; however, the role given by the society to men since ancient times and even today about leading, guiding, providing, securing the family might have been influential.

5.3.3.3. Education Level versus Behavioral Statements

In order to make analysis more efficient, primary school graduates are combined with high school graduates, so that the chi-square test could be performed.

Table 5.57: The cross tabulation of education level and the responses to statement 6 "Some banks and financial institutions may go bankrupt; bank deposits are more risky" (ambiguity aversion).

			Some banks and financial institutions may go bankrupt; bank deposits are more risky (S6)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	7	16	15	38
		% within Education	18,4%	42,1%	39,5%	100,0%
		% within S6	10,3%	45,7%	46,9%	28,1%
	Undergraduate	Number within education	41	14	13	68
		% within Education	60,3%	20,6%	19,1%	100,0%
		% within S6	60,3%	40,0%	40,6%	50,4%
	Graduate	Number within education	20	5	4	29
		% within Education	69,0%	17,2%	13,8%	100,0%
		% within S6	29,4%	14,3%	12,5%	21,5%
Total		Number within education	68	35	32	135
		% within Education	50,4%	25,9%	23,7%	100,0%
		% within S6	100,0%	100,0%	100,0%	100,0%

x^2 = 22,241; df=4; exact p value = 0,000; significant at 99% confidence level

As seen in Table 5.57, the highest approval rate (46.9%) is in the high school group, whereas the lowest one (12.5%) is in the graduate group. Moreover, when education groups are compared with each other, the highest approval rate (39.5%) is again in the high school group, whereas the lowest one (13.8%) again is in the graduate group.

Education level and ambiguity aversion have negative correlation, that is, as education level increases, ambiguity aversion declines. Maybe education creates an illusion of coping with uncertainty better.

Table 5.58: The cross tabulation of education level and the responses to statement 8 "In any condition I am able to acquire all information that I need when making investment decisions" (illusion of knowledge).

			In any condition, I am able to acquire all information that I need when making investment decisions (S8).			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	6	12	20	38
		% within Education	15,8%	31,6%	52,6%	100,0%
		% within S8	21,4%	42,9%	25,3%	28,1%
	Undergraduate	Number within education	13	8	47	68
		% within Education	19,1%	11,8%	69,1%	100,0%
		% within S8	46,4%	28,6%	59,5%	50,4%
	Graduate	Number within education	9	8	12	29
		% within Education	31,0%	27,6%	41,4%	100,0%
		% within S8	32,1%	28,6%	15,2%	21,5%
Total		Number within education	28	28	79	135
		% within Education	20,7%	20,7%	58,5%	100,0%
		% within S8	100,0%	100,0%	100,0%	100,0%

x^2 = 10,452; df=4; exact p value = 0,033; significant at 95% confidence level

As seen in Table 5.58, the highest approval rate (59.5%) is in the undergraduate group, whereas the lowest one (15.2%) is in the graduate group.

On the other hand, when education groups are compared with each other, the highest approval rate (69.1%) is again in the undergraduate group, whereas the lowest one (41.4%) again is in the graduate group.
Illusion of knowledge increases from high school to university level, then declines at graduate level. Learning may create a more rational behavior for coping with this bias.

Table 5.59: The cross tabulation of education level and the responses to statement 12 "Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency" (cognitive dissonance).

			Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency (S12)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	8	17	13	38
		% within Education	21,1%	44,7%	34,2%	100,0%
		% within S12	33,3%	50,0%	16,9%	28,1%
	Undergraduate	Number within education	13	12	43	68
		% within Education	19,1%	17,6%	63,2%	100,0%
		% within S12	54,2%	35,3%	55,8%	50,4%
	Graduate	Number within education	3	5	21	29
		% within Education	10,3%	17,2%	72,4%	100,0%
		% within S12	12,5%	14,7%	27,3%	21,5%
Total		Number within education	24	34	77	135
		% within Education	17,8%	25,2%	57,0%	100,0%
		% within S12	100,0%	100,0%	100,0%	100,0%

x^2 = 14,359; df=4; exact p value = 0,007; significant at 95% confidence level

As seen in Table 5.59, the highest approval rate (55.8%) is in the undergraduate group, whereas the lowest one (16.9%) is in the graduate group. Moreover, when education groups are compared with each other, the

highest approval rate (72.4%) is in the undergraduate group, whereas the lowest one (34.2%) is in the graduate group.

As seen from above results, cognitive dissonance and education level have positive correlation. People tend to have more dissonance as they are more educated.

Table 5.60: The cross tabulation of education level and the responses to statement 18 "The past return performance of a stock provides information about its future performance"(representativeness).

			The past return performance of a stock provides information about its future performance (S18)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	14	5	19	38
		% within Education	36,8%	13,2%	50,0%	100,0%
		% within S18	48,3%	19,2%	23,8%	28,1%
	Undergraduate	Number within education	13	15	40	68
		% within Education	19,1%	22,1%	58,8%	100,0%
		% within S18	44,8%	57,7%	50,0%	50,4%
	Graduate	Number within education	2	6	21	29
		% within Education	6,9%	20,7%	72,4%	100,0%
		% within S18	6,9%	23,1%	26,3%	21,5%
Total		Number within education	29	26	80	135
		% within Education	21,5%	19,3%	59,3%	100,0%
		% within S18	100,0%	100,0%	100,0%	100,0%

x^2 = 9,663; df=4; exact p value = 0,046; significant at 95% confidence level

As seen in Table 5.60, the highest approval rate (50%) is in the undergraduate group, whereas the lowest one (23.8%) is in the high school group.

On the other hand, when education groups are compared with each other, the highest approval rate (72.4%) is in the graduate group, whereas the lowest one (50%) is in the graduate group.

There is a positive correlation between representativeness bias and education level. It is surprising to final that education can not be cure for such a heuristic simplification.

Table 5.61: The cross tabulation of education level and the responses to statement 20 "I easily foresee that the stock market is about to decline and sell my stocks" (illusion of control).

			I easily foresee that the stock market is about to decline and sell my stocks (S20)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	6	9	23	38
		% within Education	15,8%	23,7%	60,5%	100,0%
		% within S20	17,6%	19,1%	42,6%	28,1%
	Undergraduate	Number within education	18	27	23	68
		% within Education	26,5%	39,7%	33,8%	100,0%
		% within S20	52,9%	57,4%	42,6%	50,4%
	Graduate	Number within education	10	11	8	29
		% within Education	34,5%	37,9%	27,6%	100,0%
		% within S20	29,4%	23,4%	14,8%	21,5%
Total		Number within education	34	47	54	135
		% within Education	25,2%	34,8%	40,0%	100,0%
		% within S20	100,0%	100,0%	100,0%	100,0%

x^2 = 10,041; df=4; exact p value = 0,038; significant at 95% confidence level

As seen in Table 5.61, the highest approval rates (42.6%) are shared by the high school and the undergraduate group.

On the other hand, when education groups are compared with each other, the highest approval rate (60.5%) is in the high school group, whereas the lowest one (14.8%) is in the graduate group.

There is a negative correlation between the illusion of control bias and education level. Interestingly, less educated people have more belief in

controlling the situations i.e. selling the stocks in their portfolio at the right time.

Table 5.62: The cross tabulation of education level and the responses to statement 28 "We have to diversify our investments by distributing them equally among the instruments which are being considered" (mental accounting).

			We have to diversify our investments by distributing them equally among the instruments which are being considered (S28)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	10	9	19	38
		% within Education	26,3%	23,7%	50,0%	100,0%
		% within S28	40,0%	52,9%	20,4%	28,1%
	Undergraduate	Number within education	10	7	51	68
		% within Education	14,7%	10,3%	75,0%	100,0%
		% within S28	40,0%	41,2%	54,8%	50,4%
	Graduate	Number within education	5	1	23	29
		% within Education	17,2%	3,4%	79,3%	100,0%
		% within S28	20,0%	5,9%	24,7%	21,5%
Total		Number within education	25	17	93	135
		% within Education	18,5%	12,6%	68,9%	100,0%
		% within S28	100,0%	100,0%	100,0%	100,0%

x^2 = 10,524; df=4; exact p value = 0,029; significant at 95% confidence level

As seen in Table 5.62, the highest approval rate (54.8%) is in the undergraduate group, whereas the lowest one (20.4%) is in the high school group.

On the other hand, when education groups are compared with each other, the highest approval rate (79.3%) is in the graduate group, whereas the lowest one (50%) is in the graduate group.

There is a positive correlation between mental accounting and education level. It is interesting to see that as education level increases, people have more tendencies to make diversification using 1/N rule.

Table 5.63: The cross tabulation of education level and the responses to statement 29 "The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy" (confirmation).

			The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy (S29)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Education	High School	Number within education	9	11	18	38
		% within Education	23,7%	28,9%	47,4%	100,0%
		% within S29	56,3%	45,8%	18,9%	28,1%
	Undergraduate	Number within education	6	10	52	68
		% within Education	8,8%	14,7%	76,5%	100,0%
		% within S29	37,5%	41,7%	54,7%	50,4%
	Graduate	Number within education	1	3	25	29
		% within Education	3,4%	10,3%	86,2%	100,0%
		% within S29	6,3%	12,5%	26,3%	21,5%
Total		Number within education	16	24	95	135
		% within Education	11,9%	17,8%	70,4%	100,0%
		% within S29	100,0%	100,0%	100,0%	100,0%

x^2 = 14,922; df=4; exact p value = 0,004; significant at 95% confidence level

As seen in Table 5.63, the highest approval rate (54.7%) is in the undergraduate group, whereas the lowest one (18.9%) is in the high school group.

On the other hand, when education groups are compared with each other, the highest approval rate (86.2%) is in the graduate group, whereas the lowest one (47.4%) is in the graduate group.

There is a positive correlation between confirmatory bias and education level; that is, education helps reinforcing the bias.

5.3.3.4. Income Level versus Behavioral Statements

Table 5.64: The cross tabulation of income level and the responses to statement 23 "We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline" (conservatism).

			We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline (S23)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Income Level	2000 TL and less	Number within income level	7	10	35	52
		% within Income	13,5%	19,2%	67,3%	100,0%
		% within S23	25,9%	47,6%	40,2%	38,5%
	2001-3000 TL	Number within income level	16	4	24	44
		% within Income	36,4%	9,1%	54,5%	100,0%
		% within S23	59,3%	19,0%	27,6%	32,6%
	3001-4000 TL	Number within income level	4	4	15	23
		% within Income	17,4%	17,4%	65,2%	100,0%
		% within S23	14,8%	19,0%	17,2%	17,0%
	4001 and higher	Number within income level	0	3	13	16
		% within Income	,0%	18,8%	81,3%	100,0%
		% within S23	,0%	14,3%	14,9%	11,9%
Total		Number within income level	27	21	87	135
		% within Income	20,0%	15,6%	64,4%	100,0%
		% within S23	100,0%	100,0%	100,0%	100,0%

x^2 = 13,508; df=6; exact p value = 0,033; significant at 95% confidence level.

As seen in Table 5.64, the highest approval rate (40.2%) is in the 2000 TL and less income level group whereas the lowest one (14.9%) is in the 4001 TL and higher income level group.

On the other hand, when income level groups are compared with each other, the highest approval rate (81.3%) is in the 4001 TL and higher group and the lowest one (54.5%) is in the 2001-3000 TL income group.

Conservatism is increasing parallel to income except the lowest income people. Higher income levels may create more confidence and therefore increase conservatism.

5.3.3.5. Marital Status versus Behavioral Statements

Table 5.65: The cross tabulation of marital status and the responses to statement 3 "Expert opinions in written and visual media should be taken into consideration when investing" (salience-availability-cue competition-SAC).

			Expert opinions in written and visual media should be taken into consideration when investing (S3)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Marital Status	Married	Number within marital status	9	21	64	94
		% within Marital status	9,6%	22,3%	68,1%	100,0%
		% within S3	47,4%	65,6%	76,2%	69,6%
	Single	Number within marital status	10	11	20	41
		% within Marital status	24,4%	26,8%	48,8%	100,0%
		% within S3	52,6%	34,4%	23,8%	30,4%
Total		Number within marital status	19	32	84	135
		% within Marital status	14,1%	23,7%	62,2%	100,0%
		% within S3	100,0%	100,0%	100,0%	100,0%

x^2 = 6,405; df=2; exact p value = 0,041; significant at 95% confidence level

As seen in Table 5.65, the majority of the participants (76.2%) who suffered from SAC bias are married. Moreover, 68.1% of married participants are approved statement 3, whereas 48.8% of single participants are approved it.

On the other hand, when marital statuses of the participants are compared with each other, it is seen that the disapproval rates are too close to each other (47.4%-52.6%); however, 24.4% of single participants did not approve statement 3, whereas it was only 9.6% among married participants.

Table 5.66: The cross tabulation of marital status and the responses to statement 9 "It was clear that the oil prices would not keep their high levels" (hindsight).

			It was clear that the oil prices would not keep their high levels (S9)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Marital Status	Married	Number within marital status	37	28	29	94
		% within Marital Status	39,4%	29,8%	30,9%	100,0%
		% within S9	86,0%	63,6%	60,4%	69,6%
	Single	Number within marital status	6	16	19	41
		% within Marital Status	14,6%	39,0%	46,3%	100,0%
		% within S9	14,0%	36,4%	39,6%	30,4%
Total		Number within marital status	43	44	48	135
		% within Marital Status	31,9%	32,6%	35,6%	100,0%
		% within S9	100,0%	100,0%	100,0%	100,0%

x^2 = 8,154; df=2; exact p value = 0,017; significant at 95% confidence level

As seen in Table 5.66, the majority of the participants (60.4%) who suffered from hindsight bias are married. However, when marital statuses of the participants are compared with each other, it is seen that the approval rate (30.9%) among married is less than that of (46.3%) among singles to statement 9.

On the other hand, the disapproval rates both within statement 9 (86%) and within marital status (39.4%) is too higher among married than that of among singles.

Table 5.67: The cross tabulation of marital status and the responses to statement 15 "The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains" (mental accounting).

			The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains (S15)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Marital Status	Married	Number within marital status	26	15	53	94
		% within Marital Status	27,7%	16,0%	56,4%	100,0%
		% within S15	83,9%	46,9%	73,6%	69,6%
	Single	Number within marital status	5	17	19	41
		% within Marital Status	12,2%	41,5%	46,3%	100,0%
		% within S15	16,1%	53,1%	26,4%	30,4%
Total		Number within marital status	31	32	72	135
		% within Marital Status	23,0%	23,7%	53,3%	100,0%
		% within S15	100,0%	100,0%	100,0%	100,0%

x^2 = 11,348; df=2; exact p value = 0,004; significant at 95% confidence level

As seen in Table 5.67, the majority of the participants (73.6%) who suffered from mental accounting bias are married. Moreover, 56.4% of married participants are approved statement 15, whereas 46.3% of single participants are approved it.

When marital status and behavioral biases are investigated, it appears that married people have more biases than their single peers. It is hard to comment on the probable reasons, but more research on the subject is needed.

5.3.3.6. Number of dependents versus Behavioral Statements

Table 5.68: The cross tabulation of number of dependents and the responses to statement 9 "It was clear that the oil prices would not keep their high levels" (hindsight).

			It was clear that the oil prices would not keep their high levels (S9)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Number of Dependents	None	Number within # of dependents	4	17	16	37
		% within Dependents	10,8%	45,9%	43,2%	100,0%
		% within S9	9,3%	38,6%	33,3%	27,4%
	1	Number within # of dependents	10	7	7	24
		% within Dependents	41,7%	29,2%	29,2%	100,0%
		% within S9	23,3%	15,9%	14,6%	17,8%
	2	Number within # of dependents	19	6	11	36
		% within Dependents	52,8%	16,7%	30,6%	100,0%
		% within S9	44,2%	13,6%	22,9%	26,7%
	3 or more	Number within # of dependents	10	14	14	38
		% within Dependents	26,3%	36,8%	36,8%	100,0%
		% within S9	23,3%	31,8%	29,2%	28,1%
Total		Number within # of dependents	43	44	48	135
		% within Dependents	31,9%	32,6%	35,6%	100,0%
		% within S9	100,0%	100,0%	100,0%	100,0%

x^2 = 17,468; df=6; exact p value = 0,007; significant at 95% confidence level

As seen in Table 5.68, the highest approval rate both within statement 9 (33.3%) and within number of dependents (43.2%) is seen among participants who have no dependent whereas the lowest approval rate within statement 9 (14.6%) and within number of dependents (29.2%) is seen among participants who have one (1) dependent.

It is not found any meaningful correlation between number of dependents and hindsight bias.

Table 5.69: The cross tabulation of number of dependent and the responses to statement 12 "Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency" (cognitive dissonance).

			Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency (S12)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Number of Dependents	None	Number within # of dependents	6	7	24	37
		% within Dependents	16,2%	18,9%	64,9%	100,0%
		% within S12	25,0%	20,6%	31,2%	27,4%
	1	Number within # of dependents	6	10	8	24
		% within Dependents	25,0%	41,7%	33,3%	100,0%
		% within S12	25,0%	29,4%	10,4%	17,8%
	2	Number within # of dependents	3	13	20	36
		% within Dependents	8,3%	36,1%	55,6%	100,0%
		% within S12	12,5%	38,2%	26,0%	26,7%
	3 or more	Number within # of dependents	9	4	25	38
		% within Dependents	23,7%	10,5%	65,8%	100,0%
		% within S12	37,5%	11,8%	32,5%	28,1%
Total		Number within # of dependents	24	34	77	135
		% within Dependents	17,8%	25,2%	57,0%	100,0%
		% within S12	100,0%	100,0%	100,0%	100,0%

x^2 = 14,707; df=6; exact p value = 0,022; significant at 95% confidence level

As seen in Table 5.69, the highest approval rate both within statement 12 (32.5%) and within number of dependents (65.8%) is seen among participants who have 3 or more dependents whereas the lowest approval rate within statement 12 (10.4%) and within number of dependents (33.3%) is seen among participants who have one (1) dependent.

It is not found any meaningful correlation between number of dependents and cognitive dissonance.

5.3.3.7. The Number of the Firms' Stock in Portfolio versus Behavioral Statements

Table 5.70: The cross tabulation of the number of firms' stock in portfolio and the responses to statement 9 "It was clear that the oil prices would not keep their high levels" (hindsight).

			It was clear that the oil prices would not keep their high levels (S9)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Numbers of Firms' Stock in Portfolio	None	Number within # of firms' stock	13	12	12	37
		% within # of firms' stock	35,1%	32,4%	32,4%	100,0%
		% within S9	30,2%	27,3%	25,0%	27,4%
	1	Number within # of firms' stock	7	5	7	19
		% within # of firms' stock	36,8%	26,3%	36,8%	100,0%
		% within S9	16,3%	11,4%	14,6%	14,1%
	2	Number within # of firms' stock	5	17	9	31
		% within # of firms' stock	16,1%	54,8%	29,0%	100,0%
		% within S9	11,6%	38,6%	18,8%	23,0%
	3	Number within # of firms' stock	10	4	7	21
		% within # of firms' stock	47,6%	19,0%	33,3%	100,0%
		% within S9	23,3%	9,1%	14,6%	15,6%
	4	Number within # of firms' stock	1	5	7	13
		% within # of firms' stock	7,7%	38,5%	53,8%	100,0%
		% within S9	2,3%	11,4%	14,6%	9,6%
	5 or more	Number within # of firms' stock	7	1	6	14
		% within # of firms' stock	50,0%	7,1%	42,9%	100,0%
		% within S9	16,3%	2,3%	12,5%	10,4%
Total		Number within # of firms' stock	43	44	48	135
		% within # of firms' stock	31,9%	32,6%	35,6%	100,0%
		% within S9	100,0%	100,0%	100,0%	100,0%

x^2 = 19,131; df=10; exact p value = 0,037; significant at 95% confidence level

As seen in Table 5.70, the highest approval rate (25%) is observed among the participants who have no firm's stock in their portfolio; on the other

hand, when groups are compared with each other, the highest approval rate (53.8%) is observed among the participants who have four firms' stock in their portfolio.

Table 5.71: The cross tabulation of the number of firms' stock in portfolio and the responses to statement 28 "We have to diversify our investments by distributing them equally among the instruments which are being considered" (mental accounting).

			We have to diversify our investments by distributing them equally among the instruments which are being considered (S28)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Numbers of Firms' Stock in Portfolio	None	Number within # of firms' stock	5	3	29	37
		% within # of firms' stock	13,5%	8,1%	78,4%	100,0%
		% within S28	20,0%	17,6%	31,2%	27,4%
	1	Number within # of firms' stock	4	0	15	19
		% within # of firms' stock	21,1%	,0%	78,9%	100,0%
		% within S28	16,0%	,0%	16,1%	14,1%
	2	Number within # of firms' stock	7	8	16	31
		% within # of firms' stock	22,6%	25,8%	51,6%	100,0%
		% within S28	28,0%	47,1%	17,2%	23,0%
	3	Number within # of firms' stock	3	5	13	21
		% within # of firms' stock	14,3%	23,8%	61,9%	100,0%
		% within S28	12,0%	29,4%	14,0%	15,6%
	4	Number within # of firms' stock	1	1	11	13
		% within # of firms' stock	7,7%	7,7%	84,6%	100,0%
		% within S28	4,0%	5,9%	11,8%	9,6%
	5 or more	Number within # of firms' stock	5	0	9	14
		% within # of firms' stock	35,7%	,0%	64,3%	100,0%
		% within S28	20,0%	,0%	9,7%	10,4%
Total		Number within # of firms' stock	25	17	93	135
		% within # of firms' stock	18,5%	12,6%	68,9%	100,0%
		% within S28	100,0%	100,0%	100,0%	100,0%

x^2 = 18,259; df=10; exact p value = 0,049; significant at 95% confidence level

As seen in Table 5.71, the highest approval rate (31.2%) is observed among the participants who have no firm's stock in their portfolio; on the

other hand, when groups are compared with each other, the highest approval rate (84.6%) is observed among the participants who have four firms' stock in their portfolio. It seems like following diversification rule for portfolio formation is coupled with 1/N rule, which is never suggested by the theories!

5.3.3.8. Investment Experience versus Behavioral Statements

Table 5.72: The cross tabulation of investment experience and the responses to statement 13 "If the actual price of the stock decreases to below its purchased price, it should be held until it reaches its original purchase price to sell" (mental accounting).

			If the actual price of the stock decreases to below its purchased price, it should be held until it reaches its original purchase price (S13)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Investment experience (years)	1-3	Number within investment experience	8	17	20	45
		% within investment experience	17,8%	37,8%	44,4%	100,0%
		% within S13	15,1%	58,6%	37,7%	33,3%
	4-6	Number within investment experience	17	4	19	40
		% within investment experience	42,5%	10,0%	47,5%	100,0%
		% within S13	32,1%	13,8%	35,8%	29,6%
	7-10	Number within investment experience	11	6	7	24
		% within investment experience	45,8%	25,0%	29,2%	100,0%
		% within S13	20,8%	20,7%	13,2%	17,8%
	11 or more	Number within investment experience	17	2	7	26
		% within investment experience	65,4%	7,7%	26,9%	100,0%
		% within S13	32,1%	6,9%	13,2%	19,3%
Total		Number within investment experience	53	29	53	135
		% within investment experience	39,3%	21,5%	39,3%	100,0%
		% within S13	100,0%	100,0%	100,0%	100,0%

x^2 = 23,269; df=6; exact p value = 0,000; significant at 99% confidence level

As seen in Table 5.72, the highest approval rate (37.7%) within in statement 13 is in the 1-3 years investment experience group, but when investment experience groups are compared with each other, it is observed that the highest approval rate (47.5%) is in the 4-6 years group. It seems like relatively longer investment experience helps investors overcoming one of the common problems.

Table 5.73: The cross tabulation of investment experience and the responses to statement 23 "We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline" (conservatism).

			We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline (S23)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
Investment experience (years)	1-3	Number within investment experience	7	13	25	45
		% within investment experience	15,6%	28,9%	55,6%	100,0%
		% within S23	25,9%	61,9%	28,7%	33,3%
	4-6	Number within investment experience	13	3	24	40
		% within investment experience	32,5%	7,5%	60,0%	100,0%
		% within S23	48,1%	14,3%	27,6%	29,6%
	7-10	Number within investment experience	3	1	20	24
		% within investment experience	12,5%	4,2%	83,3%	100,0%
		% within S23	11,1%	4,8%	23,0%	17,8%
	11 or more	Number within investment experience	4	4	18	26
		% within investment experience	15,4%	15,4%	69,2%	100,0%
		% within S23	14,8%	19,0%	20,7%	19,3%
Total		Number within investment experience	27	21	87	135
		% within investment experience	20,0%	15,6%	64,4%	100,0%
		% within S23	100,0%	100,0%	100,0%	100,0%

x^2 = 15,430; df=6; exact p value = 0,016; significant at 95% confidence level

As seen in Table 5.73, the highest approval rate (28.7%) within in statement 13 is in the 1-3 years investment experience group, but when investment experience groups are compared with each other, it is observed that the highest approval rate (83.3%) is in the 7-10 years group. Results demonstrate that experience in stock markets also may create conservatism.

5.3.3.9. Percentage Invested In Stocks In A Portfolio Of 1000 TL Versus Behavioral Statements

Table 5.74: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 1 "I find winning stocks even when the stock markets decline" (overconfidence).

			I find winning stocks even when the stock markets decline (S1)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	13	11	12	36
		% within % invested in stocks	36,1%	30,6%	33,3%	100,0%
		% within S1	41,9%	35,5%	16,4%	26,7%
	25%-49%	Number within % invested in stocks	7	6	12	25
		% within % invested in stocks	28,0%	24,0%	48,0%	100,0%
		% within S1	22,6%	19,4%	16,4%	18,5%
	50%-74%	Number within % invested in stocks	8	4	15	27
		% within % invested in stocks	29,6%	14,8%	55,6%	100,0%
		% within S1	25,8%	12,9%	20,5%	20,0%
	75%-100%	Number within % invested in stocks	3	10	34	47
		% within % invested in stocks	6,4%	21,3%	72,3%	100,0%
		% within S1	9,7%	32,3%	46,6%	34,8%
Total		Number within % invested in stocks	31	31	73	135
		% within % invested in stocks	23,0%	23,0%	54,1%	100,0%
		% within S1	100,0%	100,0%	100,0%	100,0%

x^2 = 16,835; df=6; exact p value = 0,009; significant at 95% confidence level

As seen in Table 5.74, the highest approval rate (46.6%) is in the 75%-100% stock investment group; moreover, when groups are compared with each other, the highest approval rate (72.3%) again is in the 75%-100% stock investment group. As demonstrated by the results, more stock investment is coupled with overconfidence, which is not surprising.

Table 5.75: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 11 "Those who follows foreign / institutional investors at stock market win" (herd behavior).

			Those who follow foreign / institutional investors at stock market win (S11)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	13	4	19	36
		% within % invested in stocks	36,1%	11,1%	52,8%	100,0%
		% within S11	39,4%	16,0%	24,7%	26,7%
	25%-49%	Number within % invested in stocks	3	2	20	25
		% within % invested in stocks	12,0%	8,0%	80,0%	100,0%
		% within S11	9,1%	8,0%	26,0%	18,5%
	50%-74%	Number within % invested in stocks	4	7	16	27
		% within % invested in stocks	14,8%	25,9%	59,3%	100,0%
		% within S11	12,1%	28,0%	20,8%	20,0%
	75%-100%	Number within % invested in stocks	13	12	22	47
		% within % invested in stocks	27,7%	25,5%	46,8%	100,0%
		% within S11	39,4%	48,0%	28,6%	34,8%
Total		Number within % invested in stocks	33	25	77	135
		% within % invested in stocks	24,4%	18,5%	57,0%	100,0%
		% within S11	100,0%	100,0%	100,0%	100,0%

x^2 = 12,731; df=6; exact p value = 0,046; significant at 95% confidence level

As seen in Table 5.75, the highest approval rate (28.6%) is in the 75%-100% stock investment group; however, when groups are compared with

each other, the highest approval rate (80%) is in the 25%-49% stock investment group.

Table 5.76: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 20 "I easily foresee that the stock market is about to decline and sell my stocks" (illusion of control).

			I easily foresee that the stock market is about to decline and sell my stocks (S20)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	8	14	14	36
		% within % invested in stocks	22,2%	38,9%	38,9%	100,0%
		% within S20	23,5%	29,8%	25,9%	26,7%
	25%-49%	Number within % invested in stocks	12	8	5	25
		% within % invested in stocks	48,0%	32,0%	20,0%	100,0%
		% within S20	35,3%	17,0%	9,3%	18,5%
	50%-74%	Number within % invested in stocks	5	13	9	27
		% within % invested in stocks	18,5%	48,1%	33,3%	100,0%
		% within S20	14,7%	27,7%	16,7%	20,0%
	75%-100%	Number within % invested in stocks	9	12	26	47
		% within % invested in stocks	19,1%	25,5%	55,3%	100,0%
		% within S20	26,5%	25,5%	48,1%	34,8%
Total		Number within % invested in stocks	34	47	54	135
		% within % invested in stocks	25,2%	34,8%	40,0%	100,0%
		% within S20	100,0%	100,0%	100,0%	100,0%

x^2 = 14,788; df=6; exact p value = 0,021; significant at 95% confidence level

As seen in Table 5.76, the highest approval rate (48.1%) is in the 75%-100% stock investment group; moreover, when groups are compared with each other, the highest approval rate (55.3%) again is in the 75%-100% stock investment group.

Table 5.77: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 23 "We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline" (conservatism).

			We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline (S23)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	9	8	19	36
		% within % invested in stocks	25,0%	22,2%	52,8%	100,0%
		% within S23	33,3%	38,1%	21,8%	26,7%
	25%-49%	Number within % invested in stocks	1	3	21	25
		% within % invested in stocks	4,0%	12,0%	84,0%	100,0%
		% within S23	3,7%	14,3%	24,1%	18,5%
	50%-74%	Number within % invested in stocks	3	2	22	27
		% within % invested in stocks	11,1%	7,4%	81,5%	100,0%
		% within S23	11,1%	9,5%	25,3%	20,0%
	75%-100%	Number within % invested in stocks	14	8	25	47
		% within % invested in stocks	29,8%	17,0%	53,2%	100,0%
		% within S23	51,9%	38,1%	28,7%	34,8%
Total		Number within % invested in stocks	27	21	87	135
		% within % invested in stocks	20,0%	15,6%	64,4%	100,0%
		% within S23	100,0%	100,0%	100,0%	100,0%

x^2 = 13,800; df=6; exact p value = 0,029; significant at 95% confidence level

As seen in Table 5.77, the highest approval rate (28.7%) is in the 75%-100% stock investment group; however, when groups are compared with each other, the highest approval rate (84%) is in the 25%-49% stock investment group.

Table 5.78: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 28 "We have to diversify our investments by distributing them equally among the instruments which are being considered" (mental accounting).

			We have to diversify our investments by distributing them equally among the instruments which are being considered (S28)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	3	6	27	36
		% within % invested in stocks	8,3%	16,7%	75,0%	100,0%
		% within S28	12,0%	35,3%	29,0%	26,7%
	25%-49%	Number within % invested in stocks	3	1	21	25
		% within % invested in stocks	12,0%	4,0%	84,0%	100,0%
		% within S28	12,0%	5,9%	22,6%	18,5%
	50%-74%	Number within % invested in stocks	4	2	21	27
		% within % invested in stocks	14,8%	7,4%	77,8%	100,0%
		% within S28	16,0%	11,8%	22,6%	20,0%
	75%-100%	Number within % invested in stocks	15	8	24	47
		% within % invested in stocks	31,9%	17,0%	51,1%	100,0%
		% within S28	60,0%	47,1%	25,8%	34,8%
Total		Number within % invested in stocks	25	17	93	135
		% within % invested in stocks	18,5%	12,6%	68,9%	100,0%
		% within S28	100,0%	100,0%	100,0%	100,0%

x^2 = 14,095; df=6; exact p value = 0,027; significant at 95% confidence level

As seen in Table 5.78, the highest approval rate (29%) is in the under 25% stock investment group; however, when groups are compared with each other, the highest approval rate (84%) is in the 25%-49% stock investment group.

Table 5.79: The cross tabulation of percentage invested in stocks in a portfolio of 1000 TL and the responses to statement 29 "The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy" (confirmation).

			The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy (S29)			
			Strongly disagree+ disagree	Neither agree nor disagree	Agree+ Strongly agree	Total
% invested in stocks in a portfolio of 1000 TL	Under 25%	Number within % invested in stocks	3	3	30	36
		% within % invested in stocks	8,3%	8,3%	83,3%	100,0%
		% within S29	18,8%	12,5%	31,6%	26,7%
	25%-49%	Number within % invested in stocks	1	5	19	25
		% within % invested in stocks	4,0%	20,0%	76,0%	100,0%
		% within S29	6,3%	20,8%	20,0%	18,5%
	50%-74%	Number within % invested in stocks	3	2	22	27
		% within % invested in stocks	11,1%	7,4%	81,5%	100,0%
		% within S29	18,8%	8,3%	23,2%	20,0%
	75%-100%	Number within % invested in stocks	9	14	24	47
		% within % invested in stocks	19,1%	29,8%	51,1%	100,0%
		% within S29	56,3%	58,3%	25,3%	34,8%
Total		Number within % invested in stocks	16	24	95	135
		% within % invested in stocks	11,9%	17,8%	70,4%	100,0%
		% within S29	100,0%	100,0%	100,0%	100,0%

x^2 = 15,058; df=6; exact p value = 0,018; significant at 95% confidence level

As seen in Table 5.79, the highest approval rate (31.6%) is in the under 25% stock investment group; moreover, when groups are compared with each other, the highest approval rate (83.3%) again is in the under 25% stock investment group.

6. CONCLUSION

Behavioral finance is a multidisciplinary subfield of finance dealing with behavioral / psychological implications of financial decision making. It contradicts the traditional finance from the aspects of expected utility and market efficiency. Prospect theory is the descriptive explanation of how people behave, whereas expected utility is rather saying what they should do. Market efficiency theory is suggesting that market is rational and provide correct pricing, while observed market anomalies have a challenge for this argument. Investors acting in financial markets should be investigated, so that their behavior would give clues regarding the financial markets' dynamics as well as arguments of expected utility theory and its underlying assumption of rationality. This thesis' main objective is to discover how individual investors behave and make financial decisions.

Anomalous behaviors of individuals are categorized as self deception, heuristics, emotion and social interaction. As the results demonstrate, majority of the mistakes are related with self-deception, arising from cognitive disabilities. Illusion of control, and knowledge, over-optimism, conservatism, confirmation biases are the major short comings of individuals, when making financial decisions. It is hard to overcome these problems, since individuals do not see these as mistakes. Mental accounting, SAC, and the representativeness are the heuristic shortcuts that create behavioral biases and are due to limitations regarding mental capacity of individuals.

There are interesting results regarding gender. Males tend to have more biases than females. Men are more overconfident, conservative, over-optimistic and moody, have more illusion of control, illusion of knowledge and suffer more from hindsight bias, demonstrate more imitative and herd behavior. These findings are in consistency with the research previously mentioned.

Education is usually thought as developing individuals, be aware of their shortcomings, and be more rational. However, the thesis' findings indicate that majority of the biases, that is, mental accounting, representativeness, cognitive dissonance and confirmatory biases tend to increase as education can not be cure for biases and heuristic shortcuts. On the other hand, the

illusion of control and ambiguity aversion have negative correlation with education.

When marital status is considered, it induces people to have more behavioral biases, that is, SAC, hindsight and mental accounting are stronger for married people.

It is not found any meaningful correlation between number of dependents and behavioral biases.

Experience in stock markets is creating conservatism while it is helping investors in overcoming mental accounting. Finally, more stock investment is inducing overconfidence.

The results are mostly consistent with previous researches, while some are brand new. These findings are only preliminary, and have to be investigated in detail. Further researches would enlighten these topics.

APPENDIX A

Investor Psychology Survey Questions

A. Age.....

B. Gender: a) Male b) Female

C. Education: a)Primary School b)High School c)Undergraduate d)Graduate

D. Monthly income level a)2000 TL and less b)2001-3000 TL

c) 3001–4000 TL d) 4001-5000 TL e) 5001 TL and more

E. Marital Status a) Married b) Single

F. Number of dependents.....

G. Number of firms'stock in portfolio.....

H. Number of years invested in the stock market……..

I. How will you distribute 1000 TL to the stock investment.....

J. To what extent you **Strongly disagree, Disagree, Neither agree nor disagree, Agree, *and* Strongly agree** to the following statement. Please indicate by checking the boxes.

	Strongly disagree	**Disagree**	**Neither agree nor disagree**	**Agree**	**Strongly agree**
1) I find winning stocks even when the stock markets decline.	□	□	□	□	□
2) A good company's stock is a good stock.	□	□	□	□	□
3) Expert opinions in written and visual media should be taken into consideration when investing.	□	□	□	□	□
4) I realize that I am on the right track to invest if the investments of the people whose opinions I value are similar to mine.	□	□	□	□	□
5) As long as I manage my investment myself, my likelihood of winning in the stock market increases.	□	□	□	□	□
6) Some banks and financial institutions may go bankrupt; bank deposits are more risky.	□	□	□	□	□
7) If I believe in my investment strategy, I do not give much credit to the confusing new information.	□	□	□	□	□

8) In any condition, I am able to acquire all information that I need when making investment decisions.	□	□	□	□	□
9) It was clear that the oil prices would not keep their high levels.	□	□	□	□	□
10) Once the stock market indices start to rise, I think they will continue to increase in the future as well.	□	□	□	□	□
11) Those who follow foreign / institutional investors at stock market win.	□	□	□	□	□
12) Because it is hard to foresee the timing of the crisis, unsuccessful trading activities in crisis times do not imply the investor's incompetency.	□	□	□	□	□
13) If the actual price of the stock decreases to below its purchasing price, it should be held until it breaks even.	□	□	□	□	□
14) I win in the stock market when I don't take brokerage houses' / analysts' advises into account.	□	□	□	□	□
15) The sadness resulting from losses in investments have relatively greater impact on the people than the joy resulting from gains.	□	□	□	□	□
16) A company's stock about which the media often make news should be preferred when investing.	□	□	□	□	□
17) My ability to pick the stock is above that of the average investor.	□	□	□	□	□
18) The past return performance of a stock provides information about its future performance.	□	□	□	□	□
19) In the long run, bonds and bills earn more than the average stock.	□	□	□	□	□
20) I easily foresee that the stock market is about to decline and sell my stocks.	□	□	□	□	□
21) When I am in need of money, I spend the incoming dividends instead of selling my stocks.instead of selling my stocks.	□	□	□	□	□
22) The most successful investment tactic is to copy the successful investment tactics of the successful traders.	□	□	□	□	□

23) We should not panic and should stick to the original strategy even if a specific stock which we strongly believe will increase starts to decline.	□	□	□	□	□
24) The chaos created by a crisis is a thin veil hiding great opportunities.	□	□	□	□	□
25) The more information about a specific stock I have, the better it is.	□	□	□	□	□
26) The losses in bonds and bills create sadness to people more than the same amount of losses in stock because bonds and bills are less risky.	□	□	□	□	□
27) The investor is more optimistically inclined to buy the stocks of his favorite team when they win, and more pessimistic when they lose.	□	□	□	□	□
28) We have to diversify our investments by distributing them equally among the instruments which are being considered.	□	□	□	□	□
29) The positive news in the written and visual media about a specific stock that I plan to buy reinforces my tendency to buy.	□	□	□	□	□
30) The increase in the value of my stocks may be due to luck rather than my own ability.	□	□	□	□	□
31) It was clear that the foreign investors will sell their portfolio investments and leave the country.	□	□	□	□	□
32) The rumors of crisis in written and visual media affect and push me to the tendency of selling all my investments.	□	□	□	□	□

APPENDIX B

Yatırımcı Psikolojisi Anket Soruları

A. Yaşınız.....

B. Cinsiyetiniz: a) Erkek b) Kadın

C. Eğitim Durumunuz a) İlköğretim b) Lise c) Lisans d) Master / Doktora

D. Aylık Ortalama Geliriniz Hangi Aralıktadır? a)2000 TL'den az b)2001-3000 TL

c) 3001–4000 TL d) 4001-5000 TL e) 5000 TL'den fazla

E. Medeni Durumunuz a) Evli b) Bekar

F. Kendinizden hariç bakmakla yükümlü olduğunuz kişi sayısı?.....

G. Şu anda portföyünüzde kaç şirketin hissesi var?.....

H. Kaç yıldan bu yana hisse senedi yatırımı yapıyorsunuz?.....

I. Hisse senedi yatırımına ne kadar 1000 TL'den ne kadar ayırırdınız?.....

Aşağıdaki ifadelere ne ölçüde katıldığınızı: **Tamamen katılıyorum, Katılıyorum, Kararsızım, Katılmıyorum, Asla katılmıyorum** kutucuklarını işaretleyerek belirtiniz.

	Asla Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Tamamen Katılıyorum
1) Düşüşlerde dahi kazandıran hisse senetlerini bulurum	□	□	□	□	□
2) İyi hisse, iyi şirketin hissesidir	□	□	□	□	□
3) Yazılı ve görsel basındaki uzman görüşleri yatırım yapılırken göz önünde bulundurulmalıdır	□	□	□	□	□
4) Görüşüne değer verdiğim insanlar yatırım yaptığım alanlara yatırım yapıyorsalar doğru yolda olduğumu anlarım	□	□	□	□	□
5) Yatırımlarımı kendim yönlendirebildiğim ölçüde kazanma ihtimalim artıyor	□	□	□	□	□
6) Bazı bankalar ve finans kuruluşları batabilir, bankalara para yatırmak dahi tehlikeli	□	□	□	□	□
7) Yatırım stratejimin çok sağlam olduğuna inanıyorsam, yeni gelen kafa karıştırıcı bilgilere çok itibar etmem	□	□	□	□	□
8) Yatırım kararlarımı alırken ihtiyacım olan bilgilere her türlü koşulda sahip olabilirim.	□	□	□	□	□

9) Petrol fiyatlarının çok yüksek seyretmeyeceği belliydi	□	□	□	□	□
10) Endeksin yükseldiği dönemlerde gelecekte de yükselme eğilimi olacağını düşünürüm	□	□	□	□	□
11) Borsada yabancı/ kurumsal yatırımcıları takip eden kazanır.	□	□	□	□	□
12) Kriz zamanları çok öngörülemediği için bu zamanlarda zarar eden yatırımlar yapmak kişinin beceriksiz olduğu anlamına gelmez	□	□	□	□	□
13) Hisse senedinin fiyatı alınan fiyatın altına düşerse, satmak için alınan fiyata dönmesi beklenmelidir	□	□	□	□	□
14) Aracı kurumun/analistlerin önerilerini dinlemediğim zaman kazanıyorum	□	□	□	□	□
15) Yatırımlarımdaki kayıplar sonucu oluşan üzüntü beni, kazançlar sonucu oluşan sevinçten daha çok etkiler	□	□	□	□	□
16) Medyada hakkında devamlı haberler çıkan bir şirketin hissesi, yatırım yapılırken diğerlerine tercih edilmelidir	□	□	□	□	□
17) Hisse senedi seçiminde yeteneklerim ortalama yatırımcının üzerindedir	□	□	□	□	□
18) Hissenin geçmiş getiri performansı gelecekteki performansı hakkında bilgi verir	□	□	□	□	□
19) Uzun vadeye bakıldığında bono ve tahvil, borsa ortalamasından daha çok kazandırır	□	□	□	□	□
20) Piyasanın düşüşe geçtiğini kolaylıkla anlar, hisseleri elimden çıkarırım	□	□	□	□	□
21) Paraya ihtiyacım olduğunda hisse satmak yerine, gelen karpaylarını harcarım	□	□	□	□	□
22) Başarılı olmuş yatırımcıların yatırım taktiklerini taklit etmek en başarılı yatırım taktiğidir	□	□	□	□	□
23) Kazandıracağına kuvvetle inandığınız bir hisse kaybettirmeye başlasa dahi paniklememeli ve orijinal stratejiye sadık kalınmalıdır	□	□	□	□	□
24) Krizin oluşturduğu kaos, büyük fırsatları örten ince bir perdedir	□	□	□	□	□
25) Bir hisse hakkında ne kadar çok bilgi var ise o kadar iyidir	□	□	□	□	□
26) Daha az riskli olduğu için tahvil ve bonodaki kayıp aynı orandaki hisse senedindeki kayba göre insanı daha çok üzer	□	□	□	□	□

27) Yatırımcı tuttuğu takımın hissesini almada takım galip gelmişse daha optimist olurken mağlup olmuşsa daha pessimist olur	□	□	□	□	□
28) Yatırımlarımızı, düşündüğümüz enstrümanlara eşit olarak dağıtıp çeşitlendirme yapmamız gerekir	□	□	□	□	□
29) Almayı düşündüğüm bir hisse ile ilgili yazılı ve görsel basındaki olumlu haberler, alma kanatimi pekiştirir	□	□	□	□	□
30) Hisselerimin değerinin yükselmesi kendi yeteneklerimden ziyade tamamen şanstan olabilir	□	□	□	□	□
31) Yabancı yatırımcıların portföy yatırımlarını satıp ülke dışına çıkacağı belliydi	□	□	□	□	□
32) Yazılı ve görsel basındaki yoğun kriz söylemi ruh halime yansıyıp bütün yatırımlarımı satma eğilimine itiyor	□	□	□	□	□

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