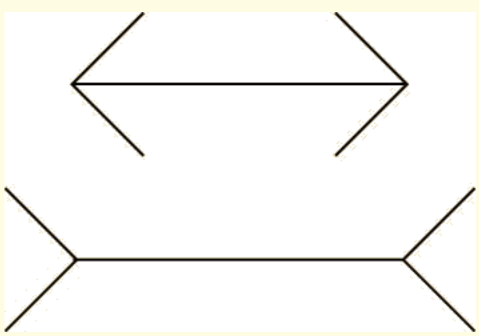
Mental Heuristics

Three birds were sitting on the tree. Two decide to fly away. How many birds are there on the tree?

Observe the following picture.

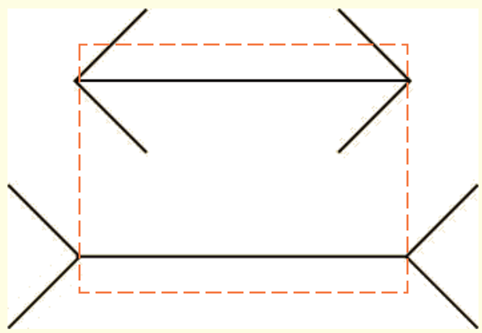
Cognitive Illusions Are Like Optical Illusions

Which Line Appears Longer?



The bottom line does appear longer but if you see the diagram below you notice that both the lines are the same.

Measurement Tools Help Identify Illusions



Although both the lines are the same why do we feel that the lower one is longer? This is known as Mental Heuristics. What is Mental Heuristics? It is the short cut the brain takes when processing information. It does not process full information and this leads to biases.

If your answer to the first question " How many birds are there on the tree?" is one, then you have just fallen prey to a mental heuristic. Your brain did not process the full information. Want the answer? There are three birds on the tree.

Two had only decided to fly away. They did not fly away. Had I told you that they flew away then you would be right?

The dictionary definition of the word “Heuristic’ refers to the process by which people find things out for themselves, usually by trial and error. This often leads people to develop rules of the thumb, but this process often leads to other errors. One of the greatest advances of behavioral psychology is the identification of the principles underlying these rules of thumb and the systematic errors associated with them. In turn these rules of thumb have themselves come to be called heuristics. In short, the following four statements define Heuristic Bias.

- People develop general principles as they find things out for themselves.
- People rely on heuristics, rules of the thumb, to draw inferences from the available information.
- People are susceptible to certain errors because the heuristics they use are imperfect.
- People actually commit errors in particular situations.

There is a newly opened mega store in the vicinity whose stock is listed on the stock markets. You see a big queue outside it and think Wow! It must be doing roaring business. You go and buy the stock hoping that it will go up because its stores are doing well. But the queue outside could be because an umpteen number of reasons. Firstly it definitely could be doing great business. It is also possible that the customers are coming to return the goods as they are defective and hence the queue. Could be that the service is so slow resulting in the queue or maybe all the stores in the vicinity are closed on that day and this is the only store opened. There are various reasons for the queue but our brain does not assess all the probabilities and makes decision on half-baked information. Stock markets are interesting because investors are doing this all the time.

Let's take the example when news of the discovery of gas by Reliance Industries Ltd. hit the market. The stock starts spurting as everyone starts buying on this news. Newspapers start flashing stories as to the size of such a discovery etc. But let us analyse the situation without becoming a prey to mental heuristics. Gas has been discovered but the same needs to be drilled which takes a lot of time and money. What is the quality of the gas? How many wells would be needed for drilling? How much time will it take? How much money would be required and what are the plans to finance the same? How easy it is going to be to extract the same? These are all very important and pertinent questions. In this time lag there are so many uncertainties the company will have to go through, before the profits are reaped. However analysts have started predicting the future profitability of Reliance and on such hopes investors start buying the stock at rising prices. This is how mental heuristics work when the brain takes a shortcut in processing information and does not process the full information and its implications. The tech boom was built on the same logic and we know the damage it has done

Evolutionary forces have shaped human cognition over centuries. The use of heuristics grew out of this evolution. They served our ancestors well, allowing for quick quality decisions. However the present conditions presents us with decisions our mind's equipment does not necessarily deal well with. The heuristic we rely on carry associated biases, which undermine the quality of our decisions. Below we review a few major heuristics and their biases.

Availability Heuristic: One bias associated with availability is ease of recall. One is likely to judge more recent or easy to remember events as more numerous than other instances of similar but harder to recall events. Information flow around us guides us. If all the news and information around us is positive we also tend to be positively inclined. This is what happened to the India Shining story in 2003/4. All available information whether in the press, the media, the bureaucrat talks, the corporate cocktails or the politicians' speech cantered around positives of the Indian economy. No negatives were available to have any recall value. With so much of optimism around we had the herd mentality in play and everyone not only started believing the India Shining story but also started advocating it. This was reflected in the stock markets going up from an index of as low as 2800 in April 2002 to over 6000 in April 2003. The NDA and its allies were sure to win the elections as the India Shining story reflected their good performance in managing the economy. The elections results were announced in May 2004 and the NDA government lost. How did this happen with India Shining? The post mortem revealed that the India Shining story was very aggressively sold in the major cities. The exit polls in these cities revealed positive feedback on the chances of NDA coming back to power. The available data from the urban cities was no correct reflection of what was happening in the rest of the country where 70% population is in the rural areas. The votes of the rural and the poor matter and for them India was not shining. Thus NDA lost. So you are more guided with the information available. On the 17th May 2004 when it dawned that the NDA would not come to power, the markets crashed by more than 800 points in just two days. The reason: every available information was negative. A pall of gloom prevailed. Enter Stock Markets, in bull markets you get only positive news and in bear markets only negative news. That is one of the reasons as to why markets go up or come down on reflexivity.

Representative Heuristic: Individuals assess the likelihood of an event by the similarity of the occurrence to their stereotypes of similar occurrences. One prominent bias associated with representative is over reaction. In such situations people over react to an occurrence. This is very prominent in the stock markets. If the leaders report impressive performance then all the stocks in that particular sector start going up on investor interest. Steel industry fortunes seemed to be changing and Tata Steel reported increased earnings and profits. All the stocks in the sector including the junk and the penny stocks evinced buying interest irrespective of the fact that they would also report increased earnings. Then you have news about the Textile industry doing exceedingly well. All available data on the textile industry is positive with companies reporting good profits. With the leaders doing well representative heuristic comes in to play. All the stocks in that sector start rising. Not only that, companies in associated industries linked to textiles like textile machinery manufacturers, spinning mills, dyes and chemicals also start attracting attention. The same was the story in the technology boom. You had only to affix a dot COM behind your company's name and the investors would start chasing. Representative heuristics also affect the investors' actions. Investors try to replicate their portfolios by following the leaders. If they find that a big fund or a big broker or a respected personality is buy a particular stock they would also buy the stock. In a way this gives rise to the herd mentality.

Saliency Heuristic: Individuals over react to a one of a kind event assuming that it is a permanent trend. They over react to such an event reoccurring. Two airplanes crash in to the World Trade Centre and the world stops flying the next day and the airplanes go empty for the next few months. Surely this type of incidence has one in a million chance of happening the next day. On the contrary the next day was the safest for flying. However people over reacted to a one off event reoccurring.

In bull markets analysts over react to a good quarterly earnings surprise assuming that the same would be repeated in the future and become bullish on the stock. In bear markets they overreact to a bad quarterly estimate extrapolating it too far in to the future. The 2004-second quarter GDP growth estimates of 10% saw the markets going up on the assumptions that the trend would continue. The same needs to be sustainable to justify good times ahead. However this is how saliency heuristic works with investors.

Overconfidence:

There is a story of a family who got ruined in the 1995 boom. The family was reasonably wealthy and living a comfortable life. The father was in the textile business and was our client for the last eight years. He was a cautious investor and was very careful in his investment decisions. Since he lacked the knowledge he would go by my advice as it matched his conservative nature. When he started business with us his son was in college and was aspiring to become a chartered accountant. The proud father was waiting for him to become one so that he could then have the right qualification to manage his portfolio. I had even told him that investment acumen does not come by becoming a chartered accountant. However he strongly believed that since it involved number crunching and stock investment was all about balance sheet analysis, and his son would be an excellent investor. The son soon became a chartered accountant and without taking any experience started handling the family's portfolio. One fine day he questions me about some investment decisions. I gave him the required explanation. After a month he seeks a meeting with me along with his father. I was shocked and pained to hear his queries. He lists some fifteen stocks in the financial services sector, which had gone up considerably, and asks me as to why I had not bought those stocks. I was a bit upset with a hindsight bias question but I thought it my duty to clarify his doubt and at the same time I hoped I would be able drill some sense in to him. I gave the explanation; " at present there is madness in the markets in financial services sector and none of the stocks deserves any investment. These were fancy stocks and there was no merit in their valuations. Moreover I told him that soon this bubble would burst and the stocks would not even have buyers. He shoots another offending question. " You being in the markets you should have known that these stocks would go up. I even knew that they would go up. Unfortunately I was not handling our portfolio or else it would have been very different." I had nothing to say to a kid who was just out of college and without any experience he was overconfident of his abilities. The proud father all along supported him. The kid started handling the family wealth and became a very active player in the markets. 1995/1996 the markets crashed. This kid lost all the family wealth, the father had a stroke and they had to leave Mumbai and settle down in their hometown in Gujrat. This happens because of the overconfidence bias. This kid thought that he knew more than anybody else just because he was a chartered accountant. This bias made him under react to any sound advice he got. There are thousands of such cases. One piece of advice: Respect the markets. They are interesting because we cannot understand them.

One word on caution: Any individual who is not professionally occupied in the financial industry and even most of those who are and who in any way attempts to actively manage an investment portfolio are probably suffering from overconfidence.

Most of the times successful investors believe that they are very clever because they are doing well with their investments. However they fail to realise that their investment performance is the result of the stock market performance and is very different from their individual abilities. This is what happens with the mutual fund industry and their fund managers. In bullish times the stock markets are up and so is the performance of most of the mutual funds. By definition they capture the mutuality of the markets. Overconfidence level rises due to the fund performance. They strongly start believing in their investing genius and go on marketing spree to garner more resources to manage. There is a famous saying "A rising tide lifts all boats" that means when the markets are booming, as they are now every type of stock goes up. Even the bad ones rise. This makes investors confident of their own abilities. The conclusion is simple "A rising market lifts all egos"

Why do people trade? Day traders trade the most. It is simply because they are overconfident of their abilities of stock picking. They believe that they are superior to an average investor. But in reality their results would be inferior to those of an average investor.

At present our fiscal deficit is something to be alarmed about but the markets and its players are in an overconfidence bias hoping that somehow we will tide over this impending crisis. However one fine day when the markets crash the analysts will come out with research reports blaming the alarming fiscal imprudence of the governments. But today one will be a fool to short sell because it does not pay to go against the herd in the short run. Moreover no one can predict when this predictable surprise will come.

Anchoring and Adjustment:

1.Conversation between Jal the investor and his broker.

Jal the investor: I need Rs.50 lacs urgently for my business. I have some gold. I need to sell it. Can you help me with that?
Broker: Jal, Why do you want to sell your gold? Instead sell this stock of Pentafour. You are making a good profit. Your purchase price is as low as Rs.150. Today it is Rs 1000.
Jal: Are you mad. I am losing in that stock. A couple of months back it was Rs.1800.

Is Jal losing? No. He being anchored to the price of Rs.1800 believes that he cannot sell it just now, as the price of Rs.1800 will sooner or later come. For him

Rs.1800 is the anchor price .He does not realise that, it was a very unrealistic price. A chance of that price coming back is very rare.

Well this is one more reason after loss aversion that most investors hold on to losing investments.

2.Husband and wife in a departmental store.

Husband: Honey look this expensive suit that I wanted to buy is on sale today. It was Rs.12000 when I saw it last week. Lets see what is the sale price?

Wife: There are so many suits on sale. Look around yo may get a better one.

Husband: Yes good idea. Lets look around…(He looks around)

Husband: I don't like any other suit. They are expensive although on sale. This Rs.12000 suit is for only Rs.6000 on sale.

Wife: In that range of Rs. 6000 there are so many other good suits. Come here.

Husband: I saw. I don't like any of them. They are not worth Rs.6000. If I were paying Rs.6000 I would rather buy that suit. At least I know that I am buying a bargain at half the cost

Wife: Ok. Go ahead and make it fast before someone takes it.

Why does he not like any other suits in the same range? He believes that they are not worth the price. He likes this suit in particular, as he knows that it is worthRs.12000. He is anchored to that price and believes that this is the only *suit, which is a bargain. The other suits do not offer him any anchor for him to think that they are bargains.*

3. Two investors Sarosh and Ketan:

Sarosh: I bought this stock of Huges Software at Rs.700.

Ketan: I feel you must sell it off. You have made a big mistake. The fortunes of the industry have changed.

Sarosh: I know but my cost price is Rs.700 and at present the stock is Rs.540.

Ketan; So what? Take the loss. The way the markets are treating such companies it may go further down.

Sarosh: Yes I will sell. I will just wait for the price to come back to my cost of purchase.

Ketan: How do you know it will come? I don't think so. Moreover you need to sell because the industry and the company dynamics have changed. Faster the better for you.

Sarosh: Yes I know that. I am just waiting for the stock to touch Rs.700.

Why is Sarosh not selling? He is anchored to his purchase price and hence is unable to take a decision. He does not see the reality as it exists. He only sees the Rs.700 price to which he is anchored. He is clinging to that price irrationally.

Individuals start with an initial value and make value assessments by adjusting from that value. The initial value may reflect historical precedent, current information or random information. The major bias reflects people's insufficient adjustment to their initial values. The problem is acute when the initial value is not properly grounded. When individuals are anchored they under react to any new information that is made available to them. This is how anchoring is dangerous when the initial value is misplaced.

A client of mine was having a portfolio of technology stocks valued at over Rs.3 crores. His initial investment was around Rs.80 lacs. He required money for his business. He came to me for advice. It was year 2000. Immediately I told him to liquidate the technology portfolio as he was still making good money. He refused to do so as he was making a loss. Why, I asked? He replied that the portfolio was around Rs.4 crores just a couple of months back and now it only Rs.3 crores. He was anchored to prices of stocks, which were not at all realistic. As of last year he was still holding on to them. Now he was making a genuine loss, as the prices were way below his cost of purchase. So now the anchor moved to his purchase price.

<u>Somewhere around June 2003 the markets started going up with good corporate earnings coming in. Moreover the bear phase had also lasted for a couple of years and it was time it ended. The markets were cheap by the yardsticks of</u>

dividend yield, price earning ratios and price to book. However when the stock and the markets started going up, many investors started liquidating their stocks at every rise They were not willing to take the new information that was available as to the changed environment. They were anchored to an index of 3000 and when it went on going up they were selling. They sincerely believed that the markets would be back to 3000 levels without any justifiable argument.

Herd Mentality:

Prakash bought a Maruti Esteem after carefully researching the decision. He was very happy with the decision and he was enjoying using the car for his long haul trips to Lonavala. After a few months a flood of strangers started approaching him and offering him smaller and smaller amounts of money to buy it from him. The vehicle was in fine shape done a few thousand miles and the engine was perfect. Still Prakash was seriously thinking of selling his Maruti for half of what he had paid for. He worried that something might have been wrong with his decision. Should he sell the car?

Before you ponder over the stupidity of the question " Why on earth should he sell his Maruti, just because people are offering him less and less? Now ask yourself as to what advise you would give him if he were pondering to sell his 1000 shares of Maruti, which he had bought for Rs. 400 and the current price had fallen to Rs.300 due to depressed stock market conditions.

Most of you would advise him to sell the shares in a hurry. History of the stock market has shown that most investors buy stocks in companies or mutual funds for presumably sound reasons but exit their holdings the moment that the market turns against them. They run out of their stocks when a bunch of complete strangers start offering them less and less for their investments than what they had paid. Conversely many investors will pay higher and higher prices for stocks or real estate or paintings just because other people whom they don't even know are willing to pay such prices. The Internet boom was on such buying.

In the stock market parlance this is known as "Investing with the Herd". In the money management business this behavior is called "The Trend is your friend" This Herd Mentality behavior is not only apparent in retail investors but is also very significant with sophisticated investors like mutual fund managers. Most of the mutual funds would have 70% of their portfolios identical. (We will discuss mutual funds in more detail later) The reason for the markets going up on reflexivity and then coming down crashing is the result of the herd mentality of the investors. If the trend is bullish everyone will enter the markets and if it is bearish everyone exits out of stocks.

We need to understand the manner in which the value is determined or in other words the way you allow other people to determine the value for you. To some extent certainly what other people think matters a great deal. Beauty may be in the eyes of the beholder but value is often in the eyes of the buyer. In our case if

Prakash wanted to sell the Maruti then it was truly worth what the buyers would pay for it. But this was only if he wanted to sell. And if he didn't then he was the only one to decide the value of his Maruti.

Enter Stock markets. Most of the time investors allow popular opinion and behavior to define value for them; sometimes for good but often not. Their buying or selling decisions are made on the basis of the value that other strangers are giving and not out of their own conviction.

Business Decisions: The herd mentality affects business decisions to a great extent. Why do we find some very few people doing extremely well in a particular business and the rest mediocre? How can one be a winner in a business? By doing something different. However we find the herd mentality very prevalent in business. People want to replicate the leaders doing well and the end result is that all are doing the same thing. Same strategies are followed and this leads to cutting prices for market share. This is very evident in the stock broking business. With the advent of technology it became very easy to give trading terminals across the country. Now today most of the brokers are doing the same thing and to compete in such a competitive market trading commissions charged by brokers have gone to as low as 3 paise. Differentiation comes by bringing the commissions down and not doing something different that would add value to the clients. That's how herd mentality works in business.

Bigness Bias:

1.Two friends Gautam and Salman out of college after graduation take up jobs. Gautam starts saving from day one by putting aside Rs 300 every month earning him 10% per annum. He does this for ten years and then stops as he starts a family and requires more money. After college Salman got married and did not save for the next ten years. However after ten years, he too started saving and putting aside Rs.300 every month earning him 10% per annum. He continued doing this for the next 30 years until he retired at the age of sixty. Salman invested Rs.1, 08,000 and Gautam only contributed Rs.36, 000.

When both of them retire who will get more money? The obvious choice would be Salman as he has been saving for the last thirty years. However you are dead wrong if you think so. The reality is that at the age of sixty Gautam gets Rs.10, 51,212 while Salman gets Rs.6, 21,787. This is the power of compounding which investors normally forget. The reason is very simple. Salman could not in any way make up for the ten years that Gautam's money was growing at a compounded annual rate of 10% per annum. Our mind always tends to look at the big numbers and we ignore the small. Yes this does coincide with the mental accounting concept where we talked about spending big amounts as against spending on groceries. In money matters small figures are very important as they are very likely to escape your attention but in the end it is those small amounts, which make all the difference.

Many investors come to us and very reluctantly ask: Do you manage small amounts of money? Or can I start making investments with a small capital? We always encourage them and insist that if you need to grow big you need to start small, but stay invested let time be your best friend. The longer you hold the better for you. In fact our mission statement of our portfolio management services reads, “We create high net worth individuals, we do not chase them”. We believe in the power of compounding.

Day Traders: With the advent of the Internet and online trading this breed of day traders have mushroomed. They are in the business of trading in stocks. Get in fast and get out fast. It is their overconfidence that makes them get in to this business of day trading. To add to that is the attraction of very low brokerage charged by the broker. Can they really make money considering the amount of transaction charges and brokerage they pay with each trade? They don’t give much importance to these costs, as they seem very trivial. But if they really calculate the cost at the end of a year they will find it worthwhile to quit the day trading business and become a broker.

Expense Ratio of Mutual Funds: Investors buy and sell mutual funds. It’s the in thing today. But how many investors or intermediaries today look at the expense ratio of a fund. Very few and even if they do it is more as an academic exercise. Expense ratio is where the research costs, salaries and other management expenses of a fund are deducted from the mutual fund holder's account every year. If the expense ratio of the fund is 2% that means that for every Rs100 you have in the fund Rs.2 will be deducted from your account every year. Now if one is invested in two funds, one having an expense ratio of .75% and the other 2.5%, the difference in the expense ratio of 1.75% can impact the returns to a very great extent. Investors need to be aware of such small details when they invest in mutual funds. Paying attention to small numbers can get handsome rewards. This is how it works.

Comparison of two funds. One high cost and the other low cost. Show after 3,5 and 10 years.

Pattern Recognition:

It is a known fact that Human minds are not perfectly rational, God did not program our minds to work in a perfectly logical manner, as a matter of fact a huge part of the World Economy is run by irrational behavior, For Example, Smoking of Tobacco, drinking of Alcohol, Eating of Junk food, all of these are injurious to health but we yet continue to do so, Diamonds solve no useful purpose but yet it has a huge value due to it's emotional perception which is primarily determined by Advertising and the "Snob appeal". The whole media and

Advertising Industry are based on perception and playing on human emotions of Greed, fear, desire and love.

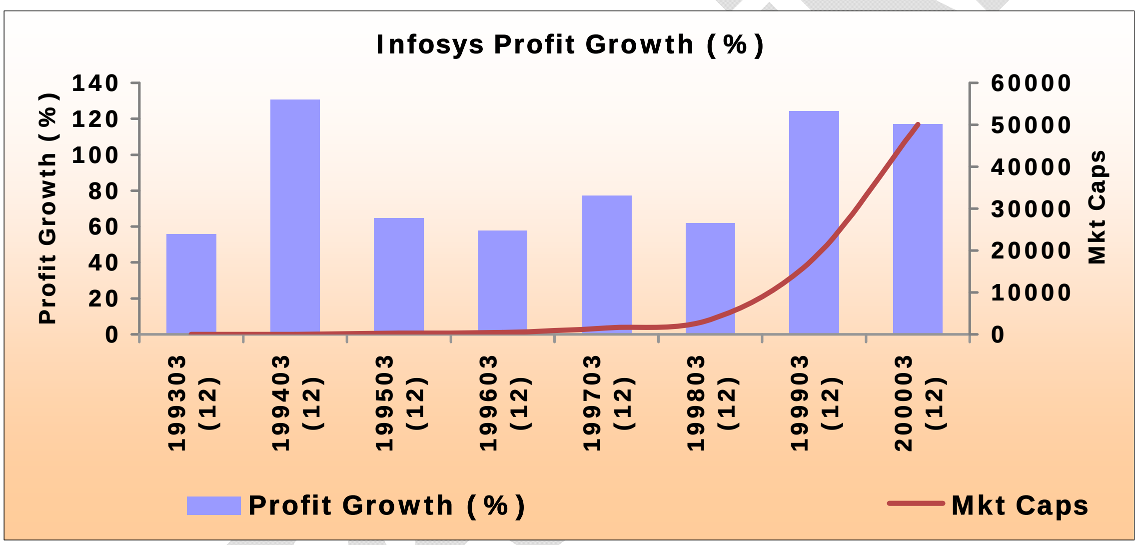
One can illustrate irrational human behavior through this 1980 Marketing Gimmick carried out by the American Cola major, Pepsi carried out research where consumers were given unidentified samples of cola with Coke and Pepsi and most of the consumers chose Pepsi and a large percentage of these consumers had chosen Coke over Pepsi when the samples were identified. Coke conducted a similar research which gave them the same hypothesis that people like the sweeter flavor that Pepsi had, taking a cue from this, Coke decided to Re-Launch itself as New Coke in a sweeter avatar, this $1 billion marketing failure made Coke finally realize that people did not drink Coke because of its taste but because of its Brand which gave the consumers the imagery and associations with Good old “Americana”.

Leaving aside Rational and Irrational thinking, Maslow's theory of Motivation is all pervasive and applicable in all aspects of our lives, careers, emotional needs and behavioral imbalances, hence this also affects us as investors.

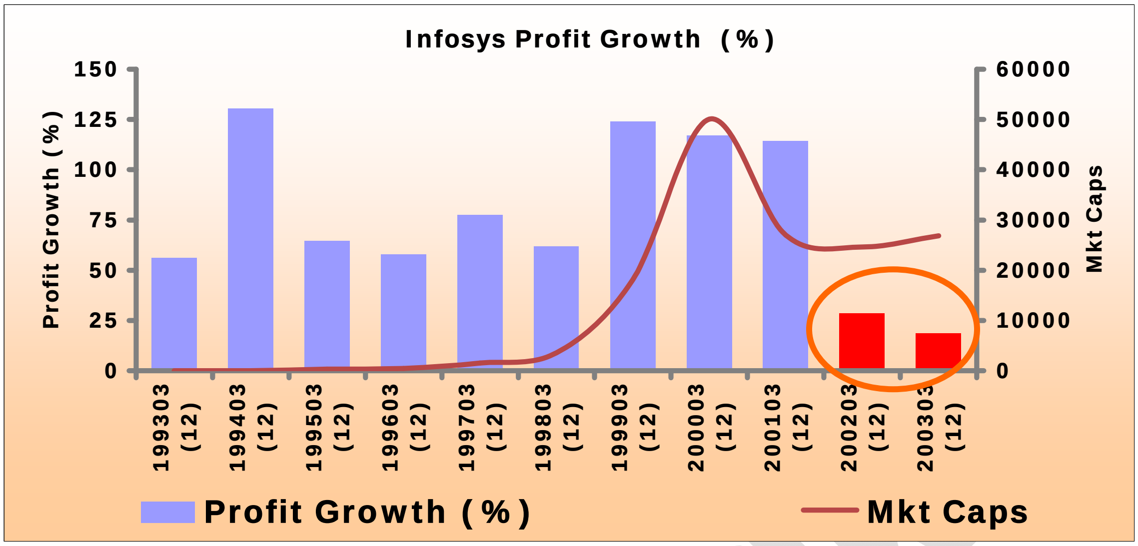
One of the examples of how our brains works comes from the concept of Pattern Recognition that has been critical for the growth of our species. The way we learnt language as children, mathematics in school and almost everything we learn we learn through repetition as our mind believes in repetition, i.e. **Patten recognition.** Now this very concept that has helped us learn so much, can be dangerous for us when investing that is why one needs awareness towards this route the mind takes.

I illustrate this in the following Example:

We see profits of the blue chip Infosys growing above 50 % since 1992. Post 1998 the company grows at 100% and the market consensus is that it will grow at the same rate in the future and hence the price run up discounting the bright future of the Industry. Every market participant and his aunt believe Infosys is the stock of the century.



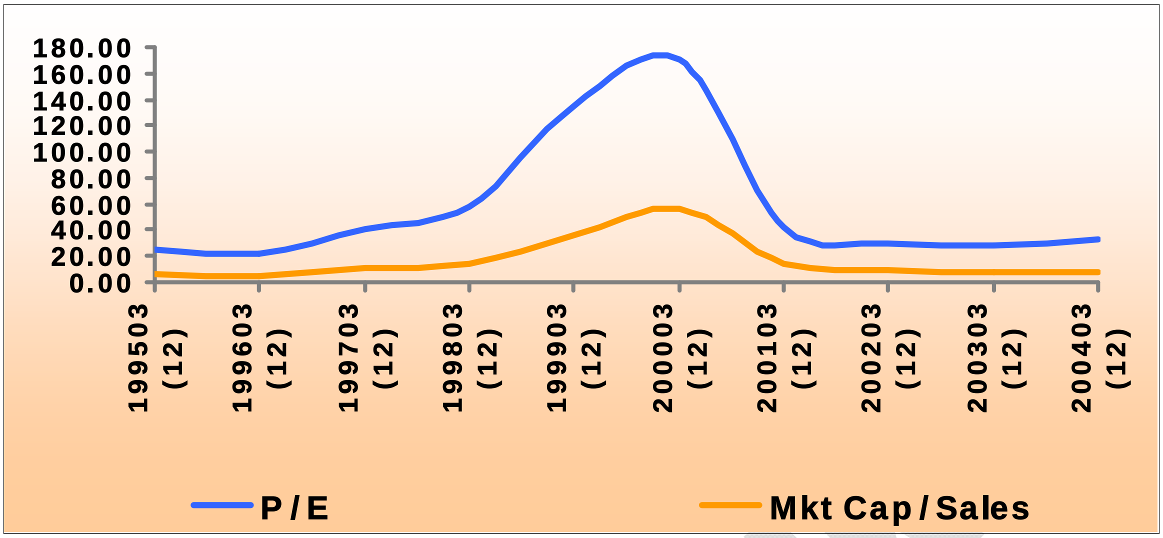
The concept of pattern recognition makes us believe more and more that future will see constant above 70-80 % growth rates, where do you think the next profit growth bar will be?



Due to a sudden Industry Slowdown the profit growth dropped below its historical averages and mind you nothing else has changed in the company only the pattern made by the investor has gone for a toss and the stock is punished.

It seems the longer a stock does well, the investors get more confident that the stock will continue to do well and therefore the investors award it with higher and higher multiples, well illustrated in the Infosys price history chart.

Infosys Price Multiples



* Monthly Average Prices

Investors, anchor their future projections in past performance, seeing the future as a repeat of the past. It is a normal human trait.

It's scientific fact that the brain stops working or does not function at its full capacity when it panics, so what's the use of having a great brain if it cannot make intelligent decisions when it needs to the most. Therefore all defense services for training of their elite forces have strenuous stress tests in place to see how their commandos react when under stress.

As in life, this is very applicable in investing as well, we panic both ways, i.e., when we think we have missed the bus and we need to get in on some hot sector or we overreact to some small negative information in any of our investments, the Dot – com boom in America and the crazy multiples commanded by the Indian I.T vendors is a point in reference which makes me conclude that any decision taken in Panic and with any EMOTIONAL BAGGAGE will most often than not, come to haunt us at a later date.

Investing is a fairly emotional activity and we cannot help that, all we can do is try to be aware of our senses and programmed responses to specific situations.

A very good example of mental heuristic is the Mutual Fund Industry. Mutual Funds are considered the most efficient instruments ever invented to mobilise the savings of the retail investors in to the stock markets. The next chapter helps you to understand the same.