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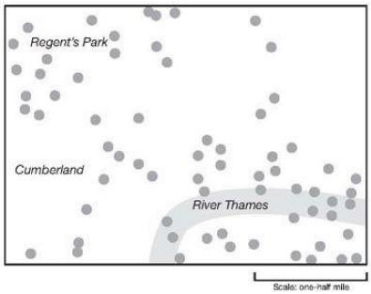
Misconception of Chance

"Statistics produce many observations that beg for causal explanations but do not lend themselves to such explanations. Many facts of the world are due to chance, including accidents of sampling. Causal explanations of chance events are inevitably wrong."

– Daniel Kahneman, 'Thinking, Fast and Slow'

Towards the end of the world war II, the Nazi Germany had developed cruise missiles and guided ballistic missiles, known as V1 and V2 respectively (V stood for 'Vergeltungswaffe' or 'Vengeance'). They launched these missiles from the European coasts with their primary target being London City. The newspapers in London used to publish maps, marking the sites which were attacked inside the city. Picture 1 (taken from the book, 'Nudge' by Richard Thaler), depicts one such map. Most people who looked at the map believed that Germany was targeting the densely populated areas near the river Thames and Regent's Park. There was widespread fear about Germany's precision in these attacks and also rumors that German spies lived in areas which were untouched. It was later proven that Germans simply used to point the attacks towards London city and hoped the missiles created significant damage. In essence, the attack distribution was random.



Picture 1: Map of London showing missile strikes
Source: Nudge by Thaler and Sunstein; adapted from Gilovich (1991)

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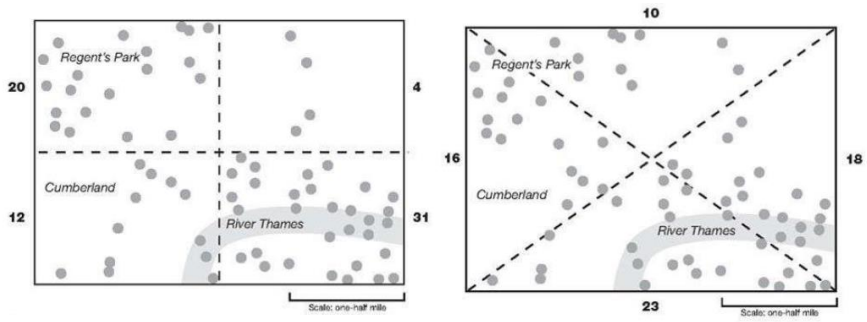
Renowned psychologist, Thomas Gilovich studied this tendency of people to assume patterns where none exist. Randomness, according to him, is lumpier than we expect. If we divide the above map into 4 quadrants like shown in picture 2a, it is difficult to believe that the bombing was random. The numbers on the side of the map indicate the number of dots (attacks) in each quadrant. Clearly a significant many are found in the Thames and Regent's Park areas. However, if we divide the area diagonally as show in the picture 2b, the view changes. The attacks now seem well dispersed and random.



Picture 2a: Quadrant split Picture 1 Picture 2b: Diagonal split Picture 1

Source: Nudge by Thaler and Sunstein; adapted from Gilovich (1991)

Statistical studies have shown that the attacks were random, but our mind still looks for patterns. We fall prey to the 'Texas Sharpshooter' fallacy where a gunman fires a few shots at a wall and then draws the bullseye around the area where majority of the random shots landed (thereby calling himself a sharpshooter). We are all pattern seekers who seek to explain everything in a cause and effect manner. Every occurrence of a certain regularity is analyzed as a pattern. We forget that randomness or chance can also show regularity, streak or clustering especially in small samples. Hence many a times, as Nassim Taleb puts it, we are "fooled by randomness". Or how Gilovich describes it as being vulnerable to "misconceptions of chance". Although financial markets are not entirely random, there is enough complexity to fool us into misreading a pattern.

PATTERN SEEKING IS OUR INHERITANCE

Throughout our evolution, Homo Sapiens have tried to hunt for patterns in information. Interpreting these patterns has helped our species survive. As hunter-gatherers, knowing the patterns of the

movement of animals (predator or food) was essential. As farmers, identifying the weather patterns and the ideal sowing areas became important. Our brains developed seeking causes and trying to understand the world as an orderly system.

However, when we move away from simple into complex, our causal thinking exposes us to mistakes. Consider this example given by Daniel Kahneman: Six babies are born in a sequence in a particular hospital. The sex of the babies is obviously random and independent of each other. Consider three possible sequences of boys (B) and girls (G) being born:

a. BBBGGG b. GGGGGG c. BGBBGB

Are these sequences equally likely? If the intuitive answer that comes to your mind is "No", you are wrong! Since the sex of the babies are independent of each other, any of the three sequences are equally likely. However, to our mind, only sequence C looks random.

Think about forecasting the next move of the stock market indices. Though predicting the short-term direction of the market is a difficult and complex exercise, so many people seem to be boldly predicting it. It doesn't matter that the person making the forecast doesn't have any experience with such predictions, there is likely to be a discernible confidence in his prediction. Later, a correct prediction helped by randomness is often touted as skill. The converse is also true. Since stocks or portfolio rarely move in one direction without any interruptions, often an adverse move within an expected probability is misunderstood as a change in direction.

Investors are continuously studying patterns and correlations to make sense of it and profit from it. If one is not conscious of the role of chance, some biases can impact decision making

In the financial markets, investors are bombarded with huge amount of data every minute. Investors are continuously studying patterns and correlations to make sense of it and profit from it. If one is not conscious of the role of chance, these biases can impact decision making:

Gamblers Fallacy or Monte Carlo Fallacy: On a roulette table, gamblers expect that over many rolls, the number of times the ball lands on a 'Red' number and on a 'Black' number will be equal. However, the

mistake people make is to expect the same pattern to show in small sequences of rolls too. In 1913, in Monte Carlo casino, a lot of people lost huge amount of money betting against black while the ball fell in black 26 times in a row. It would be prudent to think hard before going against the market purely because of a long streak of gains or losses.

Recency bias: Investors generally give disproportionately high importance to the recent data or market movement to make their forecast about the future or their investment decisions. Short term patterns may not represent long term base rates and can lead to mistakes in investments

Availability bias: Due to our limited memory, we recall only vivid experiences, patterns or narratives. Rare events are generally easy to recall and can have undue influence on our decisions.

Hot Hand fallacy: There is a belief among basketball fans that during a game, if a player makes a few baskets in quick successions, he/she is supposed to be on a winning or a hot hand streak. And hence is likely to continue to score well through the game. Statistically however, there is no evidence of this. In financial markets, many investors fall prey to hot hand fallacy by chasing performance of recent past of stocks or portfolios. They expect recent outperformers to continue to outperform. This doesn't always happen.

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False causality: Correlation doesn't always mean causation. When you are hunting for patterns within a huge number of variables and times lines, you are bound to find some correlations. They may be merely a product of chance. So many research reports are published every day showing some correlated charts over a specific period of time (sometimes with adjusted or inverted or curated time series). Most of them fall apart if you stretch into a different time period or increase the number of observations.

Survivorship bias: Survivorship bias means looking only into winners when data about losers in unavailable or ignored. Leverage investors are prime example of this. You may see the results of an investor who has generated huge return by leveraging the portfolio (by borrowing

or using derivatives) or a portfolio manager who performed well investing in high beta, illiquid stocks. It is important to also keep in mind that for every such winner, there will be historically many losers who may have lost a fortune using the same strategy.

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HOW DO YOU HANDLE THIS?

Seeking patterns is human. Since we can't avoid it, the effort should be to get better at it and avoid some of the pitfalls. Few ideas that can work are:

- Focus on base rates and long-term data
- Set rules for processing the data in an unbiased manner
- Check for evidence of success rate of a pattern by tweaking certain conditions or timelines
- Try mock trades or paper trades when testing a new pattern
- Expect some mistakes and keep margin of safety
- Don't expect a 100% accuracy even in patterns that work
- A stop loss can help. Don't be stubborn

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ABOUT STOIC INVESTOR:

The word "Stoic" is used to describe someone who remains calm under pressure and avoids emotional extremes. For the purpose of this newsletter we refer to the "Stoic investor" as an investor who is realist (avoiding extreme optimism and extreme pessimism), resilient (withstand difficult conditions) and rational (who acts with logic and reason).