> *"Human emotion is both the source of opportunity in trading and the greatest challenge. Master it and you will succeed. Ignore it at your peril."*
> *Curtis Faith, the most successful Turtle.*

Introduction

To become a successful trader you need to understand how the human mind works when making investment decisions. Markets are comprised of individuals, all with hopes, fears and foibles. It's these human emotions that create opportunity in the market, and it's our job as traders to seek them out. However, there's one caveat: like all traders, we're susceptible to emotion ourselves. Therefore, it's of outmost importance to understand how emotion affects our decision making so that we're in a better position to mitigate its risks. Our objective with this short paper is to empower you with the knowledge and tools to successfully manage emotion in your trading. Without these skills, longevity in the market cannot be attained.

Behavioural Finance

Behavioural finance pioneers have identified the ways that human emotion affects market participants during the decision making process. Two well-known and must read books on the topic, *Robert Shiller's Irrational Exuberance and Hersh Shefrin's Beyond Greed and Fear (both part of the Chartered Market Technician curriculum),* help market participants to understand how markets work, and the reasons why they operate the way they do.

Behavioural finance focuses on the cognitive and psychological factors that affect buying and selling decisions. Research has shown that market participants are prone to making systematic errors when confronted with uncertainty and duress; they make poor assessments of risk and event probabilities. Under scenarios of emotional stress, behavioural finance has proved that traders seldom make rational decisions. Successful traders understand and benefit from this, but more importantly, they know how to protect themselves from the destructive effects of human emotion.

How many times have you felt the following emotions while trading?

- **Hope:** I really hope this stock goes up after I buy it.
- **Fear:** I can't handle another loss, I'll skip this trade.
- **Greed:** I'm really doing well in the market, I'm going to increase my risk.
- **Despair:** This trading system doesn't work, I keep losing money with it.
- **Regret:** I wish I hadn't traded with such high risk.

QuantLab identifies opportunities in the market arising from these consistent human traits. Let's briefly examine how human emotion and irrational thinking create repetitive patterns that provide money making opportunities, as well as ways to protect yourself from making the very mistakes that create these opportunities in the first place.

Behavioural Biases

People have evolved certain ways of looking at the world. Many of these perceptions, although useful in more primitive settings, get in the way of successful trading. Distortions in the way people perceive reality are called cognitive biases by scientists. We'll now discuss some of the most powerful misperceptions that you need to be aware of in order to successfully trade a quantified portfolio.

- **Loss aversion:** Traders tendency to strongly prefer avoiding losses to acquiring gains. Most studies suggest that losses are twice as powerful, psychologically, as gains. Loss aversion implies that one who loses R100 will lose more satisfaction than another person will gain satisfaction from a R100 windfall.

  Risks: Affects traders ability to follow a quantified trading system because the losses incurred are felt more strongly than the gains. This may lead to traders skipping trades, or jumping from system to system at the first sign of adversity. Loss aversion often results in "get-evenitis", or holding a losing position in the hope that it will recover to breakeven.

  Prevention: An effective way to help dampen our tendency toward loss aversion is to frame it as follows: loss aversion can lead to averting gains. In other words, if you don't take a loss when directed by the system, you effectively lock capital into a losing trade that could otherwise be employed in new profitable opportunities. Further, remind yourself that a losing trade may be losing for a reason, and by not closing the trade when directed you potentially open your account to catastrophic loss.

  Loss aversion my also lead traders to continually swop to seemingly better performing strategies when they experience drawdown. This is a sure-fire method to loose over the long run. Keep this in mind – as with the markets, strategies have a tendency to mean revert. In other words, strong performance is generally followed by underperformance, and weak performance is generally followed by outperformance. Bouncing from strategy to strategy invariably leads traders to abandon strategies just before they recover and enter strategies just before performance begins to deteriorate.

  Understanding this bias means that you recalibrate your view of losses so that they represent the same emotional magnitude as gains. Focusing on the big picture or long-term performance of a strategy is another way to deal with this tendency.

- **Sunk costs effect:** Traders tendency to continue investing in something that clearly isn't working. People treat money that has already been committed or spent as more valuable than money that may be spent in the future.

Risks: Affects traders ability to take losses. Consider a trader that receives a signal from his quantified system to exit a trade and take a loss of –R1000. Loss aversion makes it extremely painful for the trader to consider exiting the position because that would make the loss permanent. As long as the position is open he believes there's a chance the market will come back and turn a loss into a win. The sunk cost effect makes the decision not one of deciding what the market is likely to do in the future, but one of finding ways to avoid wasting the -R1000 already spent, or taking the loss. People will often continue spending time, effort or money to try and fix what isn't working instead of cutting their losses and moving on.

Prevention: Understand that losses are as much a part of trading as winners. A trader who does not understand this is analogous to someone willing to breathe in, but not breathe out; if you don't breathe out you'll die. Trading is no different. Small losses become big losses, and big losses become a disaster. Learn to take losses and realise that any one trade or string of trades is meaningless within the big picture. Provided your system is behaving within expectations, follow the signals with unwavering conviction and discipline. Don't second guess signals or try outsmart the system when confronted with taking a loss.

- **Disposition effect:** Traders tendency to sell shares whose price has increased, while keeping assets that have dropped in value. People tend to lock in gains and ride losses. Related to the sunk cost effect since both provide evidence of traders not wanting to face the reality of a loss.

  Risks: Affects traders ability to let winners run and cut losses short, a prerequisite for successful trading. The tendency to lock in winners results from the desire to avoid losing the winnings. For traders who exhibit this tendency, it becomes very difficult to make up for large losses when winning trades are prematurely cut short.

  Prevention: See prevention for sunk cost effect above. Remain disciplined and resolute when entering exit signals for positions that are currently trading profitably. Fight the urge to close profitable positions early by reminding yourself that letting profits run to their proper exit point is fundamental to all successful trading. Violating this rule reduces your probability of success.

- **Outcome bias:** Traders tendency to judge a decision by its outcome rather than by the quality of the decision at the time it was made.

  Risks: Much of life is uncertain. As a result, traders or their systems are often required to make decisions that are considered rational and appear correct, but due to unforeseen circumstances will not lead to the desired outcome. In trading, even a correct approach can result in losing trades, perhaps a few in a row. These losses can cause traders to doubt their system, which leads them to evaluate their system negatively because the outcome has been negative. This may lead to traders abandoning perfectly healthy systems due to overweighting the outcome of the trade

as opposed to considering the quality of the systems decision to enter.

Prevention: Beware of judging a closed trade purely by its return. Doubt that may creep in based on return is best dealt with by reviewing past trades and their entry prices. If the entry trigger, without the foreknowledge that the trade would result in a negative return, makes logical sense, then the trade should be viewed in a positive light because the decision to enter at the time was rational.

The actual outcome of a trade decision will often be determined by chance, with some risks working out and others not. Traders whose judgments are influenced by outcome bias are seemingly holding their systems responsible for events beyond their system's control.

- **Recency bias:** Traders tendency to place greater importance on recent trade data and experience.

  Risks: A trade that was made yesterday weighs more heavily than do trades from last week or last year. Two months of losing trades can count as much as or more than 6 months of winning trades that occurred previously. Thus, the outcome of a series of recent trades will cause most traders to doubt their method and decision making.

  Prevention: It's important to place recent trade data in perspective. One way to achieve that is to compare the recent performance with performance from the past. For instance, if your portfolio is experiencing drawdown, compare the current drawdown to that of the past. If it falls within expectations then there's no rational reason to abandon the strategy. It's important to bear in mind that the recency bias means that your discipline will be tested the most just before a system begins to recover from drawdown, often resulting in traders throwing in the towel only to watch their abandoned strategy post new highs in the subsequent months.

- **Anchoring:** Traders tendency to rely too heavily on readily available information when making decisions involving uncertainty.

  Risks: Traders may anchor to the recent performance of a system and make decisions based on how the current performance relates to that performance. For instance, traders may anchor to recent highs in strategy performance. This results in a skewed perception of the current performance and can affect a traders ability to remain disciplined.

  Prevention: Anchoring to recent highs or lows in strategy performance is completely arbitrary and meaningless in the long-term performance of a strategy. Instead of comparing current performance to readily available information such as recent highs in performance, rather compare current performance with sufficient backtested performance to avoid irrational conclusions about a strategy.

- **Belief in the law of small numbers:** Traders tendency to believe that a small sample closely resembles the population from which it is drawn. Taken from the statistical law of large numbers, which shows that a large sample drawn from a population does closely resemble the population from which it was taken.

  Risks: A small sample does not reveal much about the underlying population. If we are to agree that there are nine market environments – normal/high/low volatility across bull/bear/sideways markets – then the minimum sample of trades expected to reasonably resemble the population of trades would be 270 (30 * 9, 30 is generally agreed to be the smallest number to represent statistical significance). Belief in the law of small numbers causes traders to gain and lose too much confidence too quickly. If a strategy only completes 10 trades with a 10% win rate, many traders would conclude that the system doesn't work, but there's not enough data to draw a rational decision about the strategies effectiveness.

  Prevention: At the very minimum a system should be run for at least 30 trades before evaluating its performance. It's important to compare live results with backtested statistics drawn from similar market environments. As an example, if a trader completed 30 trades during a low volatility bull market, there is no sense comparing his live sample to backtested statistics drawn from a high volatility bear market. Ensure that you compare the strategies live performance with relevant environments from the past. Test data since 2003, the default start date for the backtesting in QuantLab, includes nine market environments and therefore provides an average expectation across each environment over the long-term. In other words, one would need to trade the strategy through all nine environments before reasonably expecting to achieve the backtested performance. In order to more accurately assess the live performance of your strategy, compare it with backtested performance drawn from a similar environment. This will provide you with a better indication of how your strategy is performing within the context of the current environment.

- **Overconfidence:** Traders tendency to be overconfident in their ability to outperform the market and handle drawdown.

  Risks: Traders that fall victim to this bias typically include high risk strategies (anything generating more than 30% pa is considered high risk) in their portfolios. This can be tied to traders overconfidence in their ability to handle drawdown and volatility. There are no free lunches in the market, high returns are always associated with increased leverage, volatility, drawdown, activity and risk of ruin.

  Prevention: A good rule of thumb is to set the maximum drawdown that you're comfortable with and then halve it. This typically forces traders to revaluate their return expectations lower, but has the desirable effect of controlling overconfidence in withstanding risk. That is a wise compromise. In addition, the strategy is provided a buffer in the event it posts a new maximum drawdown.

Conclusion

Trading is difficult because we're all burdened with the above emotional challenges. It doesn't matter how effective your strategy or statistically significant your testing, every strategy will experience drawdown and losing runs. It's how we respond to those inevitable losses that determines whether or not we'll be successful in the long-term.

We hope to have broadened your understanding of emotion and its impact on traders. By understanding traders cognitive biases you're in a better position to red flag possible scenarios that may lead to irrational decision making. As traders we need to first master ourselves before we can master the markets.

If you have any questions you're welcome to contact us.

PJ Sutherland

References and further reading:

Way of the Turtle – Curtis Faith
Beyond Greed and Fear – Hersh Shefrin
Irrational Exuberance – Robert Shiller

Note: Way of the Turtle was used extensively in the above paper, and in some instances paragraphs were copied verbatim, particularly those referencing cognitive biases (I didn't feel I could improve on an already brilliant piece of work). We highly recommend this book and rank it among one of the top 5 best trading books ever written.