

# The Paradox of Experience

Patrick Sheehan, Managing Partner  
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*"The thinking on biases is an important and under-researched topic in the investment world, carrying high potential impact. It is encouraging that ETF are looking at this development in the intersection of psychology and investing seriously – they are possibly at the forefront of the industry in integrating this in the standard investment process.*

*It is logical to expect that the systematic pursuit of the understanding of one's own biases (which we all have) will contribute to better decision-making. If that's the case, I would expect other GPs, not only those with a focus on self-awareness, to follow suit."*

Elias Korosis  
Partner, Hermes GPE

# Introduction



Patrick Sheehan

"Venture capital is an inherently difficult learning environment. It's hard to use outcomes as a way of judging the quality of the decision-making process."

At ETF Partners we are fascinated by the psychology of decision-making. At first glance it might seem like psychology is something of a tangent to our everyday work as a venture capital firm, but in fact decision-making is our daily work. We think that our mental processes are just as important to our success as our organisational processes. You might be thinking that psychology sounds a little academic and abstract, but frankly we think this stuff is vital – and more than a little interesting! This paper is an exploration of 'heuristics and biases', and their power to either magnify or undermine our invaluable experience. We're choosing to distil and publish some of what we've learnt – with the aim of sharing our insights and stimulating debate within the industry.

Literature on the biases inherent in decision-making has existed on academic bookshelves for years. Yet it wasn't until 2011, when Nobel Prize winning psychologist Daniel Kahneman distilled a lifetime of research into the best-selling *'Thinking, Fast and Slow'*, that the subject really came to resonate in the mainstream business world.

Kahneman's research had one major conclusion: that the human decision-making process has systemic flaws. These 'cognitive biases' have the potential to corrupt any decision, from selecting which loaf of bread to buy to deciding whether or not to invest in a company. (See below, 'Cognitive Biases: the Essentials').

The relevance to investment quickly becomes clear to anyone involved in our sector. It is therefore surprising how little research has been carried out relating specifically to investment, and how little evidence there is of investment firms adapting their own processes to take these biases into account.

And let's be clear – we all have such biases. In fact, the chances are, you may have been more exposed than most. Why? Because intelligent people can be more prone to certain types of bias, their giant cerebrum working against them to explain away their ticks.

"...we all have such biases. In fact, as intelligent people are more prone to this, you may be more exposed than most."

But biases are only half the story (and the ugly half) when it comes to what could be termed 'imperfect' decision-making. On the flip-side there are heuristics, 'judgemental shortcuts that generally get us where we need to go – and quickly – but at the cost of occasionally sending us off course'.<sup>1</sup>

Heuristic reasoning is what Kahneman called 'thinking fast'. We don't always think in a rigid, step-by-step manner, but instead often make lightening quick associations which we then act upon. This is typically useful in situations characterised by uncertainty, but the speed of this process does leave us vulnerable to bias.

The venture capitalist has to think heuristically more often than most: there are a huge range of opportunities, reliable data is scarce and uncertainty abounds.

Venture capital is also an inherently difficult learning environment. Practitioners tend not to take many decisions – but when they do they are big. It can take years to know conclusively whether the decision to invest in any given venture led to a good result. The huge timescales involved can often lead to post-hoc rationalisations of failure. Bad luck is very easily recognised, whereas good luck is sighted less often than skill. As a result, it is relatively hard to use outcomes as a way of judging the quality of the decision-making process. All this limits reliable feedback, making learning slow. The best venture capitalist therefore tends to be one who has experienced a huge volume of overlapping decision cycles over many years and has honestly learnt from her or his experiences, both good and bad. A skilled VC will, of course, outperform over the long term – and to achieve this skill that person needs to have developed a robust understanding of their own thought processes.

In opaque environments, such as venture capital and private equity deal-making, experience is therefore the gold standard. But when we rely on experience, we are essentially thinking heuristically. Most of the time this works well, since we are naturally leveraging a complex web of associative memory that cuts to the essence of a situation. No computer is even close to replicating this creativity and lateral thinking. But there are times when this 'fast thinking' leads people astray.

1) (Gilovich, 1991)

The sense of certainty born of experience, the 'lightbulb moment' of clarity, can often be wrong. This is what we call 'the paradox of experience'. In our view, it is well worth being aware of the most likely pitfalls that come with the inevitable confidence of necessary experience.

One approach to avoiding bias is to become mechanistic and even purely data-driven. In the private investment market in particular, which is very far from an efficient orderly market, we think that neutering intuition and reining in valuable experience is simply a bad idea. For clarity, we are also not advocating the cult of investment genius. The idea of a gift that can't be taught or deconstructed is romantic hokum. In reality, every professional investment firm will check big decisions and perform extensive due diligence on, for example, new investments.

What we are talking about in this paper is getting better at understanding how information is communicated, assimilated and processed – and therefore how decisions are best taken. At ETF Partners we have taken the time to learn these valuable lessons and apply them to our own business. This paper is a distillation of some of the observations we have found most helpful.

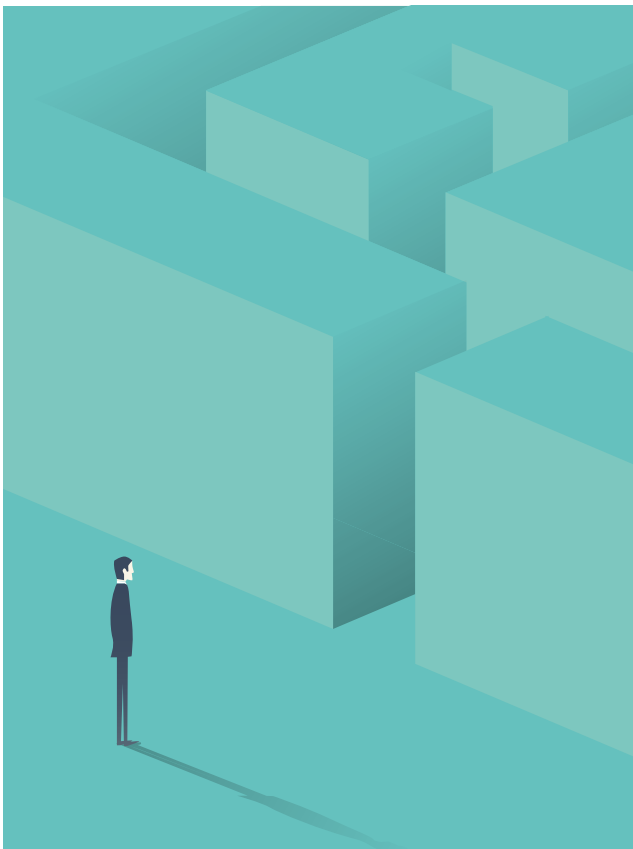
“... when we rely on experience, we are essentially thinking heuristically.”



Patrick Sheehan, Managing Partner



## COGNITIVE BIASES – THE ESSENTIALS



Before looking at venture capital specifics, this paper reviews the seven biases that we think are most relevant to decision-taking in our investment world. There are many more, but we think that appreciating these 'top 7', and developing processes to mitigate them under the stresses of real life, is a great place to start.

On the very first page of Kahneman and Tversky's 1974 paper 'Judgement under Uncertainty', which was highly cited by the Nobel Prize committee in their decision to award Kahneman the Nobel Prize in Economics in 2002<sup>2</sup>, lies an elegant challenge to the 'judgment by association' that characterises so much of human thought.

*An individual has been described by a neighbour as follows: "Steve is very shy and withdrawn, invariably helpful but with little interest in people or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail."*

*Is Steve more likely to be a librarian or a farmer?*

The obvious answer is of course 'librarian' – and it is wrong. The physical description of the man is vivid and enticing, so it lures one from the statistical probability that he is actually more likely to be a farmer, since there are far more farmers than librarians (in Europe and the USA the ratio is roughly 20:1.<sup>3</sup>)

2. (Kahneman & Tversky, 1974)

3. Admittedly, if Steve was based in Hong Kong then the most probable choice would be far less clear

This tendency to ignore statistical information in favour of narrative impressions forms a class of heuristics known as 'representativeness'.

The representativeness bias shares an underlying cause common to dozens of cognitive biases, a logical error known as the 'base rate fallacy'. Essentially, this is the tendency to forget that a specific entity, say an exciting early-stage tech venture, belongs to a wider category which can act as a reference point. This fallacy presents a particularly significant set of challenges to the venture capitalist, who often needs to counterbalance compelling narratives with an awareness of base rate probabilities. The following example, derived from Axelsson<sup>4</sup>, is particularly arresting.

*"A venture capitalist has used one of her three wishes to obtain a fortune-telling machine. This predicts whether or not a start-up will go on to become a unicorn (a company valued at over \$1 billion). The prediction is 99% accurate. After using the machine on many start-ups she eventually finds 'Company X', declared by the machine to be a future unicorn. She is very excited as, in this world, a mere 1 in 10,000 start-ups go on to become unicorns. How likely is 'Company X' to do so?"*

The intuitively obvious answer is 'very likely' – the machine is, after all, very accurate. In fact, however, Company X will almost certainly fail – the mathematical probability of it actually being a unicorn is just under 1%. The mathematics of probability are rarely intuitive, and we have 'intuitively' ignored the false positives that are not part of the obvious narrative. In other words, being right 99% of the time means that in 1% of cases the machine erroneously identifies a random company as unicorn. If all of the world's start-ups are tested with this machine, 1 in 100 will be reported as a unicorn, which is 100 times greater than the true incidence.

This is the base rate fallacy: that when thinking about something's chances we tend to focus on the qualities of the thing itself, when 'base rate' information is just as relevant. If you look carefully at some of the specific biases discussed later you may perceive how, in one way or another, the base rate fallacy plays a role in causing them.

The base rate fallacy is the first of our 'top 7'. The other six that seem most relevant to our business follow.

4. Axelsson (1999)



## AVAILABILITY: THE 'VIVIDNESS OF INFORMATION' BIAS

Another bias that is common in venture capital is that of availability – the tendency to over-weight information that comes easily to mind, and under-weight equally relevant but less exciting information. When mental images associated with a particular outcome are easily 'available', we find it easier to believe that the outcome will occur. The problem is that much relevant information – base rates, probabilities and the like – don't typically conjure compelling imagery to mind.

We are all guilty of being swayed by this 'vividness of information' bias from time to time. Examples are everywhere. Interest in fire safety leaps after a high-profile tragedy, and later falls away even though little has been done to increase safety. Many in America incorrectly believe that tornadoes kill more per capita than asthma, as tornados are considerably more dramatic.<sup>5</sup>

Research has shown that VCs, like everyone else, fall into this trap. The question we unconsciously ask ourselves is: how similar is this venture to my previous successes?<sup>6</sup> We are all, of course, very easily able to recall the images and emotions associated with our 'home runs', and we're hardwired to be biased towards ventures that remind us of these images and emotions.<sup>7</sup>

This may not seem like a problem: after all, isn't it a good thing if a venture resembles a portfolio company we just sold to Google?

But the fact is that our own 'home runs' are not the greatest source of information. It's tempting to think that, because we have a clear mental image of them, our own successes are the most salient reference points, but typically we don't have to look far beyond our own direct experience to find a wealth of superior comparables. We are simply better off if we put faith in relevant external data – data which includes the personal experiences of all other relevant investors – rather than allowing ourselves to be dominated by our own internal imagery.

The availability bias means that we are more confident in judgements that are based on exciting, memorable pieces of information. A punter who's feeling lucky may be thinking about the red-hot form of the striker he's backing, instead of whether the odds represent good value. Likewise, we also tend to be overly cautious when our judgements are based on pieces of information that we cannot bring to mind easily.<sup>8</sup> The cold statistical fact that millions of planes take off and land safely every day does nothing to ease the mind of the nervous flyer, filled as it may be with images of disaster.

This unconscious prioritising of exciting over dull information, perhaps presented in a compelling way by a passionate entrepreneur, of course leads to false assessments of risk and reward.

5. (Fischhoff, Slovic, & Lichtenstein, 1977)

6. (Fischhoff, Slovic, & Lichtenstein, 1977)

7. (Zacharakis & Shepherd, 2001)

8. (Griffin, D., Tversky, 1992)

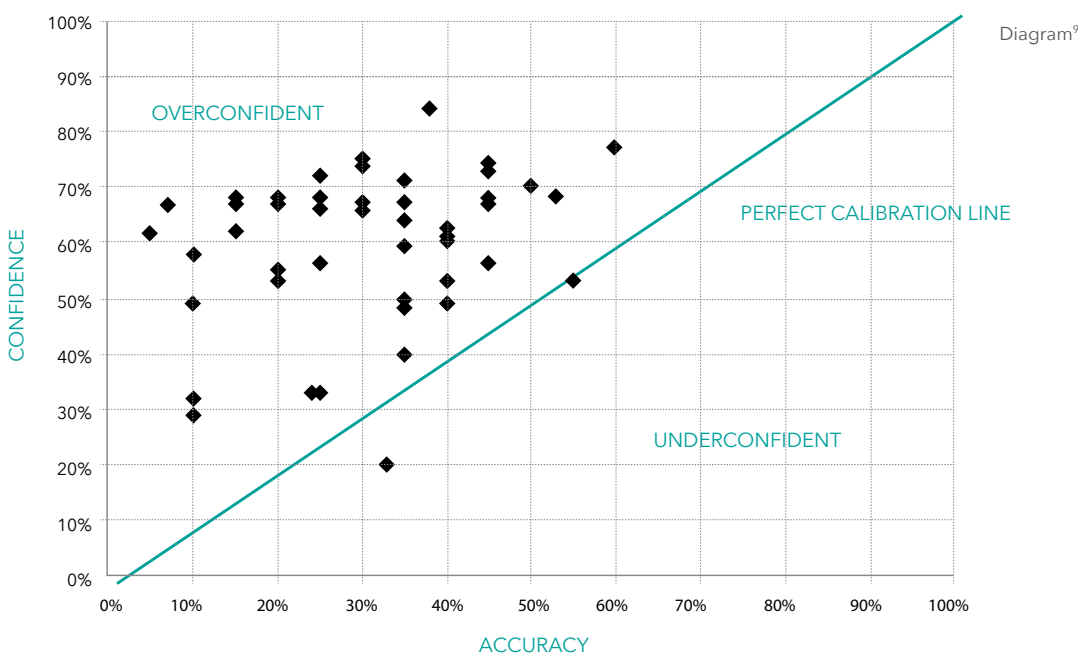


## OVERCONFIDENCE

For most VCs, successes shine far more brightly in our minds (and certainly our corporate communications) than our failures, and this availability bias likely contributes to systematic overconfidence in the sector.

In a rare study focusing specifically on venture capital, Zacharakis & Shepherd presented 51 VCs with real historical start-up pitches and asked them to predict how likely these were to succeed. The VCs were also asked how confident they were in their predictions. The result? Almost all the VCs, 96%, were overconfident in their predictions.

But does it matter if VCs are overconfident? In a word, yes. The study found a strong correlation between realism and accuracy (coefficient of 0.704). VCs are overconfident, at least in part because they overweight striking mental images and narratives; they focus on information they like and rationalise away information they don't (see 'confirmation bias') and because it can take a long time to learn from mistakes in this business. This research suggests that the best venture capitalists are those who make realistic predictions.



9. (Zacharakis & Shepherd, 2001)

## INFORMATION OVERLOAD

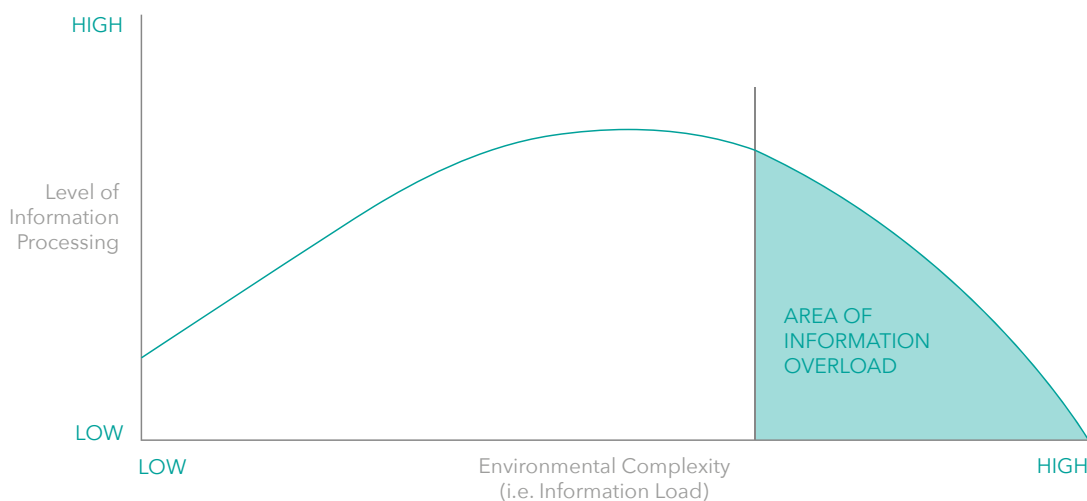
It may now be tempting to conclude that we should seek out more and more data to inform our evaluations. However, our reliance on heuristics, and therefore susceptibility to bias, increases with complexity. As the amount of information that we have to evaluate increases, it can become harder to keep track of and appraise the information that is truly relevant and useful, and to differentiate it from that which is merely memorable or striking.

There comes a point, therefore, where more information doesn't lead to better decisions, only to greater confidence. Indeed Zacharakis & Meyer (2000) found that – past a certain point – venture capitalists' predictive accuracy actually declined as they were given more information.

So we are left with a vital question: how do we know when we have enough relevant information? This is, of course, a hard question to answer. The research points to the usefulness of incorporating specific strategies, a selection of which we discuss later. One thing is for certain: we can debunk the myth that gathering more information invariably leads to better decisions.

Venture capitalists live and die by the accuracy of their predictions. Considering that venture capital already outperforms comparable asset classes, it's not hard to imagine the upside of mitigating availability bias.

INVERTED U-CURVE



Diagram<sup>10</sup>

10. From: <http://www.csbj.com/2017/03/24/monitor-your-kpis-with-a-performance-dashboard/>

### **'THE HALO EFFECT'**

Just after the telecommunications bubble burst in 2001, there seemed to be a great investment opportunity in a next generation router company. In those days, the common heuristic was, 'build something a little faster, Cisco will buy it.'

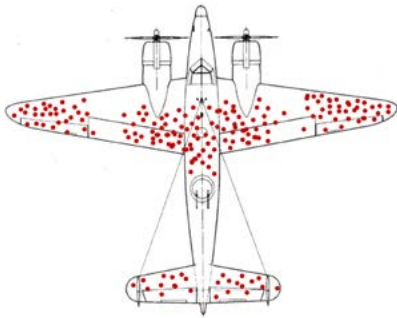
While diligence suggested that many telco customers were becoming financially troubled, it was considered to be a risk worth running, as the founder had built and sold a similar company for over \$1bn before. His status, expertise and past success trumped all other signs that capital spending in this industry might be insignificant for a long period of time, and many early adopter customers had actually collapsed. In the end, star power was not enough to counterbalance the reality: no one was spending money.

### **EXPERIENCE OVER CONTEXT**

Entrepreneurs too can be betrayed by their experiences. Running an investment operation in Silicon Valley in the 'dot com' era for an international venture capital group, I spent a lot of time advising European start-ups on how to launch in the US. One of these was a highly successful German software business run by a great German entrepreneur. He was an instinctive operator, with good intuition borne of his experience. He knew he could trust himself. However, the lunchtime beers he insisted on buying in Palo Alto did not generate camaraderie, but concern. The car policy he knew from experience to be vital, and which he insisted on implementing, was not really valued by US sales people. The share options they wanted was seen as alienating greed by him.

His US launch failed, and it was nothing to do with his product. Precisely what made him successful in Europe caused his failure in the US. He simply could not see that the intuition he had historically applied so successfully was not relevant in a different culture, and he could not adapt.

## SURVIVORSHIP BIAS: GREATNESS IS NOT A FORMULA



During WW2, researchers at the Centre for Naval excellence were looking for ways to prevent bombers from being lost during missions. Paying close attention to the data gathered from returning planes, they noticed that certain areas tended to be hit more than others. They recommended that these areas be heavily reinforced.

Their hypotheses about why only certain areas were hit were inventive, complex and story driven. The only problem is that they were completely wrong.

The truth wasn't discovered until statistician Abraham Wald reviewed the problem. He noticed that the military's study had only taken into account one part of the dataset: the survivors. Planes that had been hit in other, more vital areas had never come back at all.

A survivorship bias meant that the CNA was systematically reinforcing the least important parts of the bombers. Wald's recommendation? That reinforcements be applied only to those areas where the returning planes *had not* been hit.

The wildly successful book 'Good to Great', published in 2001, set out to investigate why some companies become great. The research team investigated all companies that had ever made the Fortune 500, roughly 1400, and found 11 that met their definition of greatness.<sup>11</sup> They carried out detailed investigations into these 11 companies, and concluded that they became great due to their adherence to 'the Hedgehog Concept' – described as combination of passion and strategic discipline.

Yet in the seven years after publication of the book, the 11 companies (including Wells Fargo, Circuit City and the crisis-struck Fanny Mae) actually underperformed the S&P500.<sup>12</sup>

So what happened? For a start, the research had a survivorship bias built into it. The authors did not investigate the traits of the 1400-odd companies that had not become 'great'. Could adherence to the Hedgehog Concept have been found in these companies as well? The researchers' conclusion would only really be supported if the Hedgehog Concept was not found in the companies that did not go from good to great.<sup>13</sup>

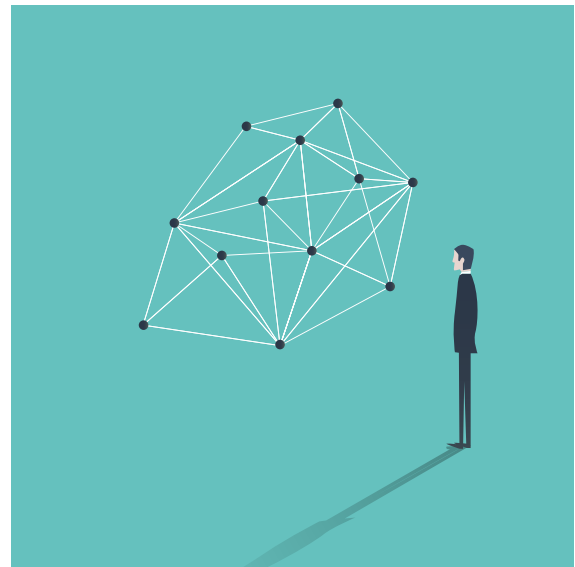
11. <https://www.publishersweekly.com/978-0-06-662099-2>

12. <http://freakonomics.com/2008/07/28/from-good-to-great-to-below-average/>

13. <https://blog.asmartbear.com/business-advice-plagued-by-survivor-bias.html> (2001)

Indeed, it is likely that the combination of factors resulting in the success of the 11 companies was much more complicated and incoherent than the neat 'Hedgehog Concept' would suggest. The idea that the successes of 11 vastly different businesses can be explained together as having been caused by any single common internal trait, let alone one as amorphous as the Hedgehog Concept, is innately flawed.

This tale speaks of a general refusal to acknowledge the role played by randomness when dealing with very large sets of hard-to-analyse data. A causal narrative involving hedgehog metaphors was preferred. We are all guilty of giving too much credence to narratives because we, as a species, appreciate the intoxicating combination of certainty, intrigue and simplicity that they provide. Even worse: a strong narrative can often cause us to become overly rigid in our thinking – over-prioritising one possible combination of factors – whereas in fact it is often preferable to maintain a protean mental landscape of possibilities, probabilities and percentages, all just waiting to be tweaked by the latest piece of salient data.<sup>14</sup>



As an aside, we now hear a lot of talk about 'big data'. While clearly there is much mileage to be had with the ability to analyse very large data sets, the 'Good to Great story' carries a warning. As ever more data is combed analytically, there is the potential for ever more compelling causal narratives to be found – far more of course than really exist. Sorting out the most true from the most compelling is a growing challenge.

14. (Gigerenzer, Hoffrage, & Kleinbolting, 1991)

## SIMILARITY BIAS: WHAT YOU ARE IS WHAT YOU LIKE<sup>15</sup>

Investors, like everyone else, feel comfortable and relaxed in the company of those who are similar to themselves. And when comfortable and relaxed we tend to be more accepting and less critical. Thus we are predisposed to unconsciously and irrationally prefer those similar to us.

Some might take umbrage with the suggestion of irrationality. Success in venture capital requires wisdom, professionalism and amiability – are these not characteristics to favour? And after all, are we not more likely to work well with those who share our characteristics? But the similarity bias is not limited to relevant attributes. Management research has long suggested that superficial characteristics tend to enter our decisions. Indeed, physical appearance plays a worryingly large role in the outcome of job interviews, despite the predictable lack of evidence to indicate that attractiveness plays any role in job performance.<sup>16</sup>

One study found that when evaluating business plans, individual VCs show a marked preference for entrepreneurs with a similar educational and professional history.<sup>17</sup> Engineers prefer engineers, MBAs prefer MBAs, and so on. Likewise, those VCs with a history of working in start-ups tend to overlook the potential of entrepreneurs with a background in established firms, and vice versa.

*"The similarity bias means that the persons evaluating business plans have systematically different preferences."<sup>18</sup>*

The study found that, in a typical venture capital firm, just over half the time only one individual will evaluate a potential investment before deciding whether or not to invite the team in – leading to potential distortions in the screening process.

15. (Franke et al., 2006)

16. (Borman, 1991)

17. (Franke, Gruber, Harhoff, & Henkel, 2006)

18. (Franke et al., 2006)

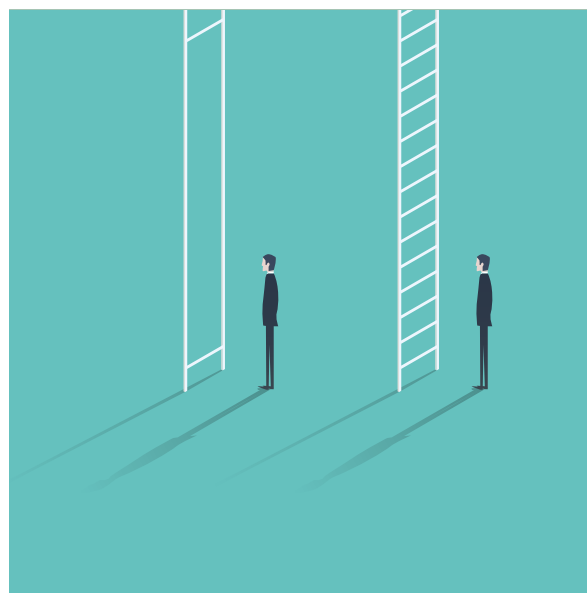
## CONFIRMATION BIAS

*"I know that most men – not only those considered clever, but even those who are very clever, and capable of understanding most difficult scientific, mathematical, or philosophic problems – can very seldom discern even the simplest and most obvious truth if it be such as to oblige them to admit the falsity of conclusions they have formed – conclusions of which they are proud, which they have taught to others, and on which they have built their lives." LEO TOLSTOY*

We are all liable to breezily accept information that supports our pre-existing beliefs, and to harshly scrutinise that which would force us to change our minds. This is confirmation bias, possibly the easiest bias to see in others and the hardest to see in ourselves.

Confirmation bias is particularly dangerous for professional investors. It's been implicated in the general tendency of investors to hold on to losing stocks for too long, as they unconsciously prefer information that argues against the painful selling of stocks at a loss.<sup>19</sup>

One important consequence of confirmation bias is that the order in which we receive information tends to matter. We're generally prejudiced in favour of that which we hear first. We can unconsciously use this information as an anchor, rejecting later information which may have affected us had we heard it initially.



19. (Knauff, Budeck, Wolf, & Hamburger, 2010)



## FAULTY OPTICS

I was standing in the office of a very well-known and celebrated Silicon Valley VC in the late-1990s during the height of the telecoms boom. He told me with great confidence that while the opportunity under discussion might not be the very best, there was room for hundreds of great optical companies given the scale of change he predicted in telecoms. I felt that there was room for just two, or maybe three successes. He was an investor with an exceptional track record and hard-earned authority. On the other hand, I happened to have a PhD in (among other things) integrated optics, which I hoped gave me some insight to the practical difficulty of making optical components work. As I stood to shake his hand I noticed a dog-eared book on his desk. It was entitled 'An introduction to Modern Optics.'

The dangers of confirmation bias are not moderated by intelligence. In fact, there's plenty of evidence to suggest that the smarter we are, the better we are at rationalising our favoured account. This compelling certainty might make us particularly persuasive – think a myopic politician or earnest salesperson – but it leaves us vulnerable to believing our own myths.

*"Smart people believe weird things because they are skilled at defending beliefs they arrived at for non-smart reasons."*<sup>20</sup>

Groupthink is a sort of social confirmation bias, in which we prefer certain information because it supports what everyone else thinks. This is an emotional bias: we're so motivated to maintain a harmonious atmosphere and to be seen as a team player that we suppress dissenting information which could actually be vital.

Groupthink leads to an 'illusion of invulnerability': if no one thinks there's any chance of something going wrong then why should it?

20. Michael Shermer

## HARNESSING THE MONSTER

So what is to be done about these key biases?

After all, few of us have the time or energy to painstakingly comb through our decision-making processes looking for signs of irrationality. This would probably take so long, and be so demoralising, as to be counter-productive. Or we would end up falling victim to confirmation bias: finding that our decision process is bias-free because that's what we want to find. In fact, bias operates so unconsciously and is so ingrained into normal patterns of human reason that taking an introspective approach on an individual basis simply doesn't work. Simply knowing or accepting that you have biases is no remedy.

*"It starts with the recognition that if we try, like Baron Münchhausen, to escape the swamp of biases by pulling ourselves up by our own hair, we are unlikely to succeed."*<sup>21</sup>

However, Professor Kahneman et al. have demonstrated that unconscious ticks can be neutralised or harnessed at the level of an organisation.

This is achieved by a simple series of procedural checks and balances that remove any need for naval-gazing and take the onus off the already-stressed individual. Those investment firms that are collegiate in culture and rigorous in their processes already have the framework in place to easily implement these powerful techniques.

*"A recent McKinsey study of more than 1,000 major business investments showed that when organizations worked at reducing the effect of bias in their decision-making processes, they achieved returns up to seven percentage points higher."*<sup>22</sup>

To quote Daniel Kahneman, what excites us the most is the potential for 'medium-sized gains by nano-sized investments'.

The goal is not to fight against heuristics, but to harness their power to our advantage.

21. (Lovallo & Sibony, 2010)

22. (Lovallo & Kahneman, 2011)

## PRE-MORTEM

*"Whenever we propose a solution to a problem, we ought to try as hard as we can to overthrow the solution, rather than defend it. Few of us, unfortunately, practise this precept."*

KARL POPPER, PREFACE TO THE LOGIC OF SCIENTIFIC DISCOVERY

Recently my partners and I were in a break-out room, discussing a very interesting and very complicated prospective investment. The company in question had recently started successfully selling a product based on new technology. Many far larger groups had tried but failed to launch similar offerings. The market was large but rapidly changing. We were intrigued, but it was very difficult to understand the dynamics of the situation and we were having a protracted discussion about it. We needed a change of perspective. So I asked the team to conduct a pre-mortem. 'We have invested. It is 3 years on and it's been a disaster. What went wrong?'

My colleague, who had been leading the charge, paused for thought, said 'that's easy...', and proceeded to give us a simple and convincing answer. The different perspective cut through the complexity and pointed us to the key risk.

And by the way, once we had focused our efforts on understanding this key risk, we came to the quick decision not to take this particular prospect forward.

Conducting a pre-mortem means brainstorming all the ways in which a project could implode - with the aim of avoiding a painful post-mortem.<sup>23</sup> It challenges overconfidence and the excessive optimism of groups' biases which by themselves are hard to spot and even harder to challenge.

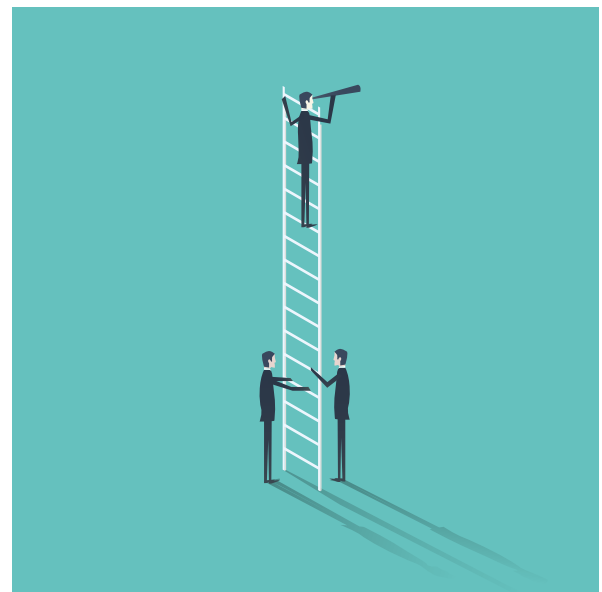
The pre-mortem harnesses the creative power of heuristics, but in the opposite direction to normal. By creatively deconstructing our positive mental images and narratives we open our minds to neglected possibilities. The pre-mortem acts as a counterbalance to many of our innate biases.

23. (Klein, 2008)

BIAS	EFFECT OF BIAS	HOW PRE-MORTEM FIGHTS BACK
Availability	Vivid information overweighted	Accesses different mental representations
Overconfidence	Naïve optimism	Encourages realism
Survivorship	Focussing on successes	Reminds us of relevant failures
Confirmation	Neglecting that which doesn't support desired outcomes	Actively reverses confirmation
Groupthink	Reaching bad decisions for social reasons	Empowers dissenting opinions

This approach is invariably efficient and sometimes surprising. It's amazing how often difficult subjects open themselves up and neglected threats become visible. Those with nagging doubts are given the space to develop and argue their concerns, and project advocates are freed from feelings of defensiveness. The propositions which benefit most from a pre-mortem are often the most popular ones – even though they are normally popular for obvious reasons.

Despite focusing on potential negatives, the outcome of a pre-mortem is often a sense of relief that something has been nipped in the bud which would otherwise have been overlooked. The pre-mortem is not a silver bullet, but it's light, time-efficient, and powerful.



## REFERENCE CLASS FORECASTING

Reference class forecasting is a method of prediction arising from the study of heuristics, and it's beginning to catch on. Indeed the UK government has used reference class forecasting in projects such as an extension of the Edinburgh tram line and the Crossrail development.<sup>24</sup>

Broadly, it involves:

1. Identifying a category (the reference class) to describe the thing we are trying to predict something about
2. Finding the typical outcome for the reference class, and how often and by how much this tends to vary
3. Using the typical outcome, and its typical variance, as a starting point from which to think about the likelihood of the desired outcome

The major benefit? That it prevents us from focusing solely on the internal qualities of whatever we are evaluating, known as the 'inside view'. An entrepreneur might be brilliant and a product unique, but that isn't the end of the story. Reference class forecasting focuses our attention firmly on base rates, and typically provides an antidote to overconfidence and spurious narratives.

This is a great method to combat the 'illusion of control' which arises from biased thinking: an illusion that makes it seem like we alone are masters of our destiny. We cannot focus solely on our own qualities. That would be like relying on the superiority of our ship to get us through a strait strewn with shipwrecks, without taking heed of the prevailing winds or the paths of doomed vessels. If this sounds like common sense that's because it should, but it's the sort of thinking that we can be tempted to ignore in the tumult of the real world.

The trick in venture capital is to get the level of precision right when deciding what to use as a suitable reference class. Using 'start-up companies' as a reference is typically too broad. Likewise, 'companies with our patented technology' is likely to give a very small sample size, probably of just one. Indeed, in this scenario we may be tempted to believe that the uniqueness of the technology makes the company incomparable, and therefore allows our judgement to be overly dependent on the internal qualities of the company such as scalability, potential impact and quality of the team. But if we get creative, a useful reference class can normally be found.

25. (Flyvbjerg, 2008)

## CHECKLISTS

If the pre-mortem is typically met with curiosity and occasional enthusiasm, checklists tend to receive an altogether different reception. The word itself can be mildly offensive, with its connotations of micro-management and bureaucracy and even lack of trust. None of us like the idea of being constrained by admin.

But the idea is not to replace the genius of human intuition with unthinking procedures or algorithms. This simply wouldn't work in the dynamic world of venture capital, and wouldn't leverage our best assets. According to Atul Gawande, author of the Checklist Manifesto, *"It is common to misconceive how checklists function in complex lines of work. They are not comprehensive how-to guides, whether for building a skyscraper or getting a plane out of trouble. They are quick and simple tools aimed to buttress the skills of expert professionals."*<sup>25</sup>

So what would such a checklist look like?

Kahneman and Lovallo's paper, 'Before You Make that Big Decision', provides a 14-point checklist aimed at eliminating bias from big decisions. The article is well worth a read.<sup>26</sup> As a good checklist is tailored to the specific needs of the organisation, it might be wise to pick and choose from their suggestions, and even use their ideas as a starting point in the development of a brief procedure to 'scaffold' heuristics and leverage creativity.



25. (Gawande, 2010)

26. Available at: <http://www.arrunada.org/Files/T/uom/Kahneman%20Lovallo%20Sibony%202011%20HBR.pdf>

## POSITIVE HEURISTICS: DOES BIAS NEED TO BE OVERCOME?

In recent times, some researchers have emphasised the positive attributes of heuristics instead of merely focusing on how heuristics lead to errors in reasoning.<sup>27</sup> This school of thought emphasises the profound uncertainty of the real-world in a managerial context, where decisions are not structured like simple probability tests, but in fact there is no obvious optimal choice. The argument is that in such a setting, classical reasoning can be clunky, inefficient and probably not a great use of precious time.

There is evidence to suggest that heuristics are positive when they function as an 'adaptive toolkit' that can be actively used – meaning that at some point we are consciously aware of them, know what effects they produce, and know how to mitigate their weaknesses. Putting to one side the question of whether it's possible to consciously engage with heuristics, what all parties are in agreement about is that it pays to be aware of their effects.

*'The power of heuristics can likely be further strengthened by combining them where appropriate with computationally more intensive decision aids.'*<sup>28</sup>

We take a middle view that heuristics are generally positive, but biases never are. There is also an innate human tendency to rely on such 'rules of thumb' and to avoid the sheer effort and time of deeper logical analysis (think back to the example of the unicorn identification machine). It is less usual to insist on deep logical analysis

when simple rules of thumb would be better (though this does happen, and I am sure we can all think of someone who behaves like this). So it makes sense to us to focus on heuristic biases as a first step in improving the decision-making process in venture capital. But neither mode of thinking needs to be demonised. It's 'horses for courses': heuristic reasoning and statistical logic both have their advantages in different scenarios.

## HOW WE ARE CHANGING

As you can probably tell, we take our approach to decision-making seriously. We have therefore begun to formalise our approach to harnessing the power of heuristics, drawing on many of the techniques highlighted above.

For instance, our investment proposal papers now include a section that we call the 'Bias Radar' (see overleaf). It helps us to be conscious of our biases, and those of our colleagues, and to actually discuss them. As with our use of pre-mortems, it gives us new perspectives and constructive challenges. In our view the Bias Radar is particularly effective at cutting to the chase, for a very small investment of time.

27. (Artinger, Petersen, Gigerenzer, & Weibler, 2015)

28. (Artinger et al., 2015)



In some ways, the whole topic of effective decision-taking can be boiled down to ensuring an effective diversity of perspectives. We, and many other firms, try to ensure this through collegiate discussion during which we listen to the views of all participants. The checklists, the pre-mortems, and other tools are then simply aids to, and training in, adopting multiple perspectives openly and effectively. It is rare that academic research is clearly useable in this way by the investment industry and by individual firms. It is even more unusual to find psychological research which is so fundamental to the investment business model. The research into decision-making pioneered by Kahneman and his colleagues is a rare example of directly applicable academia, and we intend to use it as much as we can.

## Bias Radar

A. Pre-Mortem- Imagine it is 3 years time and the business has failed. With the benefit of hindsight, why did it fail?

B. List key risks (do not indicate mitigation factors here)

C. If you could wait to invest in 1 year's time, what sort of information would you then want? Can you get more of it now?

D. How factual is the basis for the provided numbers? What anchors your belief in the numbers? How much do you believe?

E. Comparisons – What examples or analogies are we using in the assessment of the attractiveness of this deal? Are we overweighting on these examples in valuing the deal?

F. Does the thesis have a 'Halo Effect' (similar success story, serial entrepreneur, etc)? If so, how and why are they similar?

## REFERENCES

- 27, 28 Artinger, F., Petersen, M., Gigerenzer, G., & Weibler, J. (2015). Heuristics as adaptive decision strategies in management. *Journal of Organizational Behavior*. <https://doi.org/10.1002/job.1950>
- 4 Axelsson, S. (1999). The Base-Rate Fallacy and its Implications for the Difficulty of Intrusion Detection. *Proceedings of the 6th ACM Conference on Computer and Communications Security - CCS '99*, 1-7. <https://doi.org/10.1145/319709.319710>
- 16 Borman, W. C. (1991). Job behavior, performance, and effectiveness. In *Handbook of industrial and organizational psychology, Vol. 2 (2nd ed.)*.
- 5, 6 Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human Perception and Performance*, 3(4), 552-564. <https://doi.org/10.1037//0096-1523.3.4.552>
- 25 Flyvbjerg, B. (2008). Curbing Optimism Bias and Strategic Misrepresentation in Planning: Reference Class Forecasting in Practice. *European Planning Studies*, 16(1), 3-21. <https://doi.org/10.1080/09654310701747936>
- 15, 17, 18 Franke, N., Gruber, M., Harhoff, D., & Henkel, J. (2006). What you are is what you like-similarity biases in venture capitalists' evaluations of start-up teams. *Journal of Business Venturing*, 21(6), 802-826. <https://doi.org/10.1016/j.jbusvent.2005.07.001>
- 25 Gawande, A. (2010). *The checklist manifesto: how to get things right*. New York: Metropolitan Books.
- 14 Gigerenzer, G., Hoffrage, U., & Kleinbolting, H. (1991). Probabilistic Mental Models - a Brunswikian Theory of Confidence. *Psychological Review*, 98(4), 506-528. <https://doi.org/10.1037/0033-295X.98.4.506>
- 1 Gilovich, T. (1991). Like goes with like: The role of representativeness in erroneous and pseudoscientific beliefs. *Skeptical Inquirer*, 20(April), 34-40. <https://doi.org/10.1017/cbo9780511808098.036>

- 8 Griffin, D., Tversky, A. (1992). The weighing of evidence and the determinants of confidence. *Cognitive Psychology*, 24, 411–435.
- Intro Kahneman, D. (2011). Introduction. In *Thinking Fast and Slow*. London: Penguin Books. <https://doi.org/10.1007/s13398-014-0173-7.2>
- 2, 3 Kahneman, D., & Tversky, A. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124–1131. <https://doi.org/10.1126/science.185.4157.1124>
- 23 Klein, G. (2008). Performing a Project Premortem. *IEEE Engineering Management Review*, 36(2), 103–104. <https://doi.org/10.1109/EMR.2008.4534313>
- 19 Knauff, M., Budeck, C., Wolf, A. G., & Hamburger, K. (2010). The illogicality of stock-brokers: Psychological experiments on the effects of prior knowledge and belief biases on logical reasoning in stock trading. *PLoS ONE*, 5(10). <https://doi.org/10.1371/journal.pone.0013483>
- 22 Lovallo, D., & Kahneman, D. (2011). Before you make that big decision. *Harvard Business Review*, 89(6), 51–60. <https://doi.org/http://dx.doi.org/10.2469/dig.v41.n3.32>
- 21 Lovallo, D., & Sibony, O. (2010). The case for behavioral strategy. *McKinsey Quarterly*, 32(March), 1–16. Retrieved from [https://www.mckinseyquarterly.com/The\\_case\\_for\\_behavioral\\_strategy\\_2551](https://www.mckinseyquarterly.com/The_case_for_behavioral_strategy_2551)
- 10 Zacharakis, A. L., & Meyer, G. D. (2000). The potential of actuarial decision models: can they improve the venture capital investment decision? *Journal of Business Venturing*, 15(4), 323–346. [https://doi.org/10.1016/S0883-9026\(98\)00016-0](https://doi.org/10.1016/S0883-9026(98)00016-0)
- 7, 9 Zacharakis, A. L., & Shepherd, D. A. (2001). The nature of information and overconfidence on venture capitalists' decision making. *Journal of Business Venturing*, 16(4), 311–332. [https://doi.org/10.1016/S0883-9026\(99\)00052-X](https://doi.org/10.1016/S0883-9026(99)00052-X)



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Environmental Technologies Fund L.P. is supported by the European Communities Growth and Employment Initiative, MAP – the ETF Start-up Facility. Environmental Technologies Fund 2 L.P. is supported by the European Union through the 'Competitiveness and Innovation Framework Programme' (CIP).