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OPTIMISM AND ENTREPRENEURSHIP

A DOUBLE-EDGED SWORD

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ABSTRACT

Entrepreneurs are more optimistic than the average person. It is thus important to understand the impact of optimism on entrepreneurship success. Here, we examine how optimism affects the four critical stages of entrepreneurship: finding innovative solutions, the decision to launch a new venture, planning and implementation. We suggest that optimism enhances the likelihood of identifying creative solutions by altering imagination and increasing positive affect; induces over–confidence in the ability to successfully implement these solutions, which enhances the likelihood of entering the market; generates faulty planning that endangers the success of the venture; and during implementation furthers persistence in the face of difficulties, buffers against stress and helps entrepreneurs in building social capital. We thus show that optimism can be characterised as a double–edged sword – with the potential to help or hinder success during the different steps of the entrepreneurial process.

THE OPTIMISTIC ENTREPRENEUR

a. A rosy view of a challenging reality

Being an entrepreneur[1] is challenging. Half of all startups fail within the first four years (Derbyshire, 2013; Storey, 2011) and only about 25 per cent survive the first ten (Camerer and Lovalo, 1999; Moskowitz and Vissing–Jørgensen, 2002). Survival is not the only challenge; growth and positive income are others. Merely 26 per cent of small business will ever increase their initial size; the rest will never grow (Liedholm, 2002). New ventures lose money in the first three to four years (Biggadike, 1979) and after a decade in the business the average entrepreneur earns 35 per cent less than they would have otherwise (Hamilton, 2000). In fact, a significant number of self–employed people earn under minimum wage and entrepreneurial investments, despite carrying significant risk, do not yield higher returns than public equity investments (Moskowitz and Vissing–Jørgensen, 2002). Such high failure rates can be explained, among other things, by an unsustainably high level of new entrants into the market – roughly six times more than the economy can support (Pinfold, 1997).

Entrepreneurs are well aware of these gloomy statistics. When asked about the likelihood of success of a business like theirs, entrepreneurs provide relatively accurate numbers (Pinfold, 2001). Why then do these individuals decide to take the plunge? The answer is that while entrepreneurs are relatively realistic about the chances of success for a business *like theirs*, they have a very different view of the chances of their *own* success. For example, a survey by Cooper and colleagues (1988) revealed that 81 per cent of entrepreneurs believed their own chances of survival were better than 70 per cent, and 33 per cent indicated that they had zero probability for failure. Recent studies replicate these findings, reporting that 62 per cent of entrepreneurs overestimate projected sales for the first year; 81 per cent estimated their venture to turn operating while only 48 per cent actually did (Casser, 2010) and most expected average annual employee growth of 15.5per cent whereas similar startups grow only by 3 per cent (Pinfold, 2001).

b. Entrepreneurs take an inside view

In other words, entrepreneurs are optimists – they believe their chances of success are better than cold statistics would imply. Why do they adopt this view? When entrepreneurs evaluate the odds of success of a business like theirs, they take an outside view and do not consider the specifics of each venture, which leads to a relatively realistic evaluation. Yet, when thinking about their own venture, they adopt an inside view, taking into account perceived talents and ideas. The latter carry more weight than norms do in the estimates of potential returns (Lovallo and Kahneman, 2003). The problem is that self–evaluations of ideas and skills are often skewed in a positive direction. An individual launching a business does not perceive his/her self as average, but rather as unique. The tendency to view ourselves as better than average (known as 'the superiority illusion') is a common human tendency. When asked to rate themselves on almost any positive characteristic or ability, from attractiveness to intelligence, most people position themselves at the top 50 per cent (for review, Dunning, Heath, and Suhs, 2004). For example, 25 per cent of people surveyed believed they were at the top 1 per cent in the ability to get along well with others and 80 per cent believed they

[1]In most of the studies we cite in our review, entrepreneurs are defined as people who a) own a private business and b) are actively involved in managing the business.

were above average drivers. Thus, for entrepreneurs median growth and mean survival rates seem irrelevant, while exceptional victory stories applicable. In fact, entrepreneurs who are objectively less likely to succeed, based on their personal qualifications and the nature of their business, are as optimistic as those in a good position to succeed (Cooper et al., 1988). The inclination of the least knowledgeable/skilled to have the most biased view of their ability is known as the Dunning–Kruger effect (Kruger and Dunning, 1999). On a range of tests, from IQ to medical knowledge, those who end up doing the worst start off with the greatest ignorance of their own ignorance (Carter and **Dunning**, 2008).

c. Are optimists more likely to be entrepreneurs?

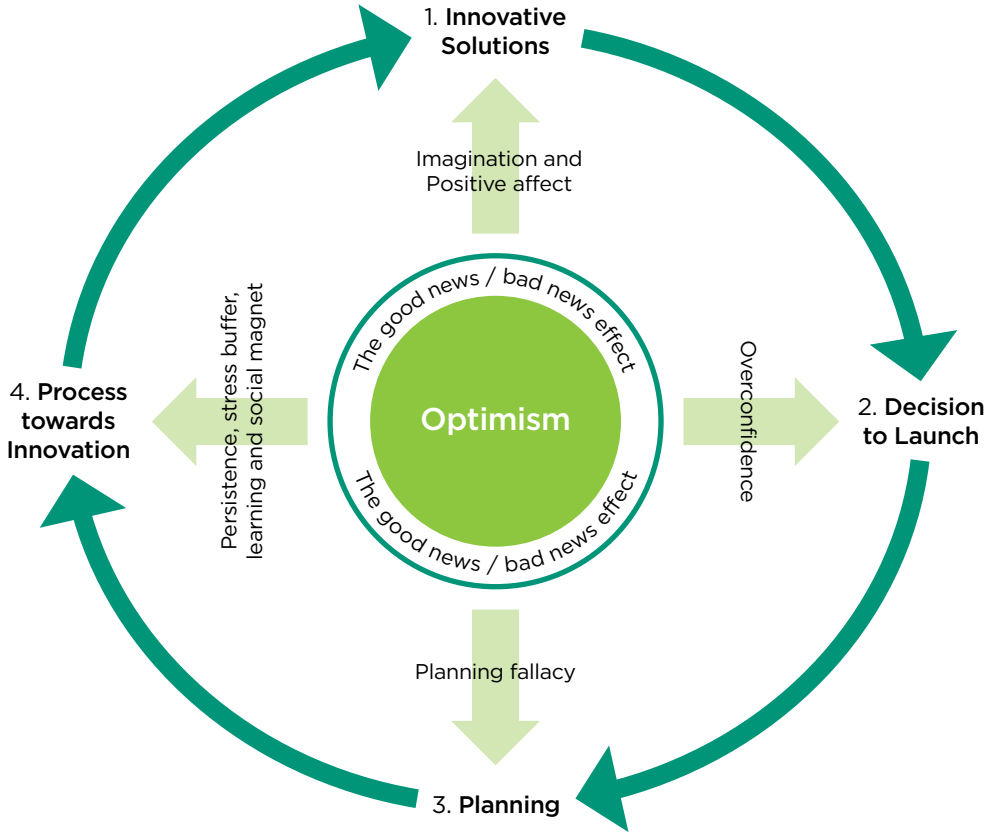
Entrepreneurs are thus not alone. Extensive research shows that people in general are optimistic about their future and their abilities, while adopting a more realistic perception of the future of others (for review, Sharot, 2011). The intriguing question is whether entrepreneurs are more optimistic than most. A survey of 6,000 American entrepreneurs found that entrepreneurs are indeed more likely to be optimistic than people with similar demographic, financial, and educational backgrounds (Puri and Robinson, 2013). Similar findings have been reported elsewhere (Arabsheibani et al., 2000; Dawson, de Meza, Henley, and Arabsheibani, 2012; Fraser and Greene, 2006), leading some researchers to label the levels of optimism found in entrepreneurs as excessive or extreme (de Meza and Southley, 1996; Gartner, 2005; Hmieleski and Baron, 2009). Indeed, relative to managers in large companies, entrepreneurs exhibit greater overconfidence in the accuracy of their optimistic predictions (Busenitz and Barney, 1997; Forbes, 2005).

These findings can be interpreted in two ways. The first possibility is that people who are optimistic are more likely to launch their own businesses, whereas people who engage in a 'colder' thinking style may be attracted to positions in large companies (Busenitz and Barney, 1997). The second possibility is that starting your own business makes people more optimistic. The rationale for the latter idea is that launching a business generates high uncertainty that together with time constraints and scarce information leads entrepreneurs to rely on intuitive thinking and optimism (Baron, 1998). In addition, high optimism reduces cognitive dissonance that is evoked by the decision to build your own venture, and lessens the stress and anxiety that would be otherwise associated with a realistic perception of the risks. To disentangle these two possibilities, the optimism of British entrepreneurs was examined *before* they made the decision to start their own business (Dawson et al., 2012). Using data from the British Household Panel Survey (BHPS), the study supported both explanations. People who decided to start their own business were more optimistic beforehand than people who did not. However, once people launched their own business, they became even more optimistic than before. This suggests both that optimistic people are particularly likely to become entrepreneurs, and that pursuing entrepreneurship further boosts their optimism.

d. How optimism affects successful entrepreneurship

The critical question then becomes whether optimism enhances or hinders entrepreneurial success. In each of the upcoming sections, we will outline relevant research from psychology and neuroscience to illuminate how optimism relates to entrepreneurial success. We will ask how optimism affects each stage in the process of innovation and entrepreneurship: from finding creative solutions to making the decision to implement them, to planning out the process of implementation and finally, execution. Our evaluation will suggest that optimism affects different stages in distinct ways, rendering optimism a double–edged sword. Figure 1 gives a schematic overview of how an optimistic disposition influences entrepreneurship.

Figure 1. **A simplification of the relationship between optimism and the four stages of entrepreneurship, based on the research reviewed here. Optimism is protected by a neural bias which favors positive over negative news, leading people to dismiss information that is not in line with their optimistic beliefs. It then affects the four stages of entrepreneurship via a number of mechanisms depicted in the graph.**



1. OPTIMISM AND CREATIVE SOLUTIONS

Innovation carries the success of new ventures and keeps companies competitive (Amabile, 1996; Ireland and Webb, 2007). Creativity is necessary for innovation (Amabile, Barsade, Mueller, and Staw, 2005) and the more creative the founding manager, the higher the level of innovation of the venture (Baron and Tang, 2011). This relationship is particularly strong in dynamic, volatile, environments such as those encountered by entrepreneurs (Baron and Tang, 2011). In this section we ask whether, and how, optimism affects creativity and innovation.

a. Optimism and imagination

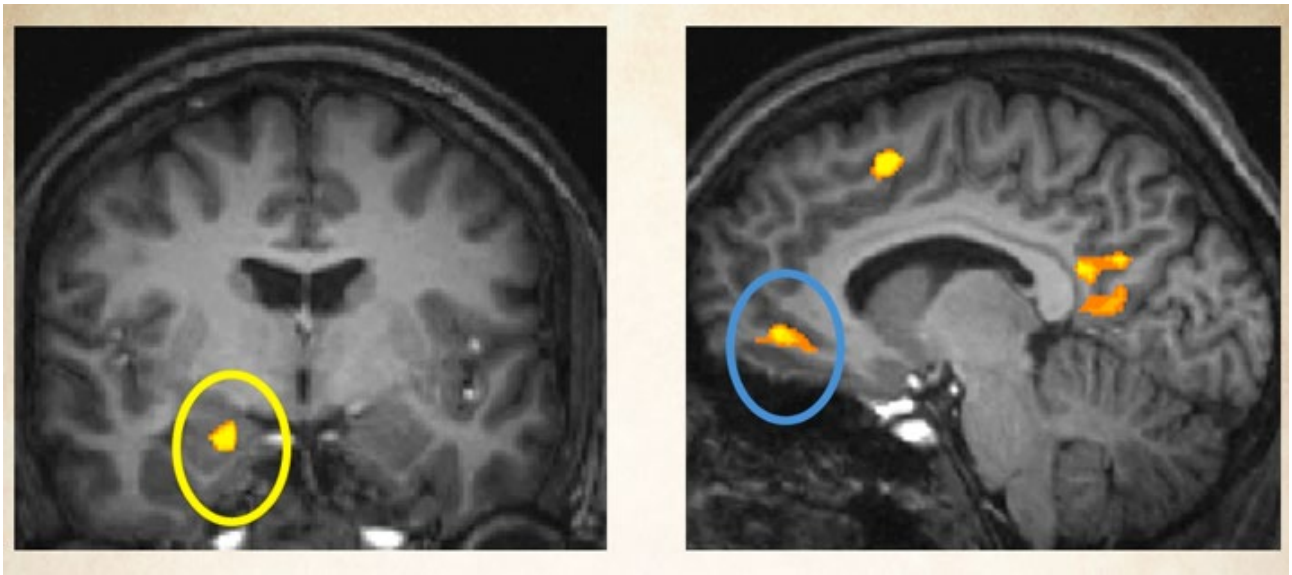
Daniel Kish, President of World Access for the Blind, lost his sight at infancy. Despite his inability to see he wanted to find a way to navigate the world so that he and other blind people could, for example, ride a bike. This goal required a novel, innovative, solution and the ability to imagine something completely different – a world in which blind people find their way through busy streets on a set of wheels. Kish had a few advantages that ultimately led to his success. First, he had extensive knowledge of biology. Second, he was highly motivated; he himself was blind and he understood the value blind individuals would gain from such a creation. Third, he believed a solution was plausible. Successful solutions are often ones that combine existing knowledge in a new way; solutions that are already out there, but were never applied to that specific problem. Kish used his existing knowledge of biology to imagine something new: a system that uses echo to let a blind cyclist move through darkness like bats in dark caves. At this initial stage, optimism helps envisioning fruitful solutions via imagination, as it guides imagination away from failures towards creative and successful solutions (Sharot, Riccardi, Raio, and Phelps, 2007). How does this work?

People use the past to imagine the future. In fact, the same brain regions that enable memory also enable imagination (Addis, Wong, and Schacter, 2007). Amnesics, for example, not only have trouble remembering their past, they also are limited in their ability to imagine a future (Klein and Loftus, 2002). Thus, imagining is bound by past experience. When people imagine the future they rarely engage in thinking in which the natural laws are abolished; rather, future scenarios are constrained by what our past suggests is plausible (Kahneman and Miller, 1986; Taylor, Pham, Rivkin, and Armor, 1998).

Optimism frees the future from the past in the sense that optimists are able to imagine an alternative, positive, future despite present constraints. In one study we scanned people's brains while they recalled past events, such as winning an award, and imagined the same events happening in the future (Sharot et al., 2007). We found that optimistic participants felt closer to positive future events than negative events and were able to imagine them with more detail. The ambiguous nature of the future allowed optimists to distance themselves from negative constraints and approach positive outcomes, creating vivid colourful images in their mind. We observed enhanced activity in two brain regions when people imagined positive future events: the amygdala, which is important for processing emotions, and the rostral anterior cingulate cortex (rACC), which is important for regulating emotions (see Figure 2). The more optimistic people were the more activity we observed in their rACC when

they imagined good outcomes. You can think of the rACC as a traffic conductor – guiding attention away from negative information and enhancing the flow of positive information by modulating activity in other areas of the brain.

Figure 2. **Increased activity in the rACC (blue circle) and amygdala (yellow circle) when imaging the future (Sharot et al., 2007)**



An optimistic disposition may thus lead people to imagine more positive future scenarios, helping them identify novel solutions and stay motivated. As positive future scenarios appear closer to optimists, two important things happen that enhance the likelihood of a creative solution to emerge. First, aspects of the solution are processed in greater detail. Second, the solution is viewed as more likely because closer events seem more real (Liberman and Trope, 1998). Enhanced detail in imagination thus makes people believe the novel idea is realistic and can be implemented. In contrast, a pessimistic disposition creates more negative future scenarios thereby lessening the likelihood of a successful idea emerging. Obstacles appear closer and are thereby perceived more probable (Liberman and Trope, 1998); potentially enhancing the likelihood that a pessimist will give up on the creative search all together. In line with this, in a study of 600 employees, optimistic personality predicted creativity as measured via supervisors' evaluation of creative behavior at work (Rego et al., 2012).

b. Optimism and positive affect

Optimistic people are happier, experience more positive affect and less negative affect (for review Carver, Scheier, and Segerstrom, 2010; see Box 1). This is partially because positive expectations produce positive feelings of anticipation and less anxiety. In our evolutionary history, positive emotions signaled to our ancestors that this is a good time to explore new areas (what is behind this mountain?) and try out novel ideas (I wonder whether that stone could be used as a weapon?), thereby gaining new knowledge (a lake is behind the mountain) and acquiring new skills (I can use this stone for hunting). In contrast, negative emotions indicated an immediate threat (a bear!), and motivated quick actions, focused on survival (run!). These days, positive emotions encourage us to try new things by widening our attentional focus, whereas negative feelings narrow our focus on the here and now (Fredrickson, 2003; Hayward et al., 2009, for an application to entrepreneurs). In a recent

study (Foo, Uy and Baron, 2009), for example, entrepreneurs reported their feelings twice a day via their smart phones for 24 days. Negative affect decreased future focus and led to effort towards currently pressing needs, whereas positive affect increased future focus and the investment of effort in tasks that yield future profits. This process underlies an observed connection between positive emotions and creativity (Lyubomirsky et al., 2005). In one study, for instance, physicians either received a bag of candies – inducing positive affect – or no bag of candies (and no positive affect) before working on a creative task (Estrada, Isen, and Young, 1994). The physicians in the 'candy–bag' group did better on the creative task. Similar, the more positive affect entrepreneurs reported, the higher their creativity, which in turn fuelled innovation in their ventures (Baron and Tang, 2011).

c. Summary

In conclusion, optimism appears to foster creativity and innovation in entrepreneurs, helping them to find novel solutions and ideas. An optimistic disposition motivates people to find new ideas by shifting the focus away from negative images towards positive ones. Positive affect, evoked by optimism, plays an important role in this process. The optimistic entrepreneur might be better prepared to find novel ideas than her pessimistic counterpart, and most likely will be happier in the process.

2. OPTIMISM AND THE DECISION TO LAUNCH

Once a creative solution is identified, a decision on whether to go ahead with the business needs to be made. In this section we examine how optimism affects this process of decision making.

a. Superiority and competition neglect

In an attempt to understand whether and how rose–coloured predictions influence an entrepreneur's decision to enter the market, it is crucial to ask why entrepreneurs are optimistic about their future success (Townsend, Busenitz and Arthurs, 2010). Two possibilities exist. First, entrepreneurs may believe in their venture because they trust the underlying idea. Second, entrepreneurs might believe in success because of their exceptional abilities. Research suggests the latter bares more weight. People enter the market because they believe their skills are superior (Camerer and Lovallo, 1999, see Box 2) and a vast literature supports this notion (Townsend et al., 2010; Koellinger et al., 2007; Simon, Houghton and Aquino, 2000; but see Lowe and Ziedonis, 2006). For example, in one study, 300 entrepreneurs were asked how confident they were in their entrepreneurial skills, how likely they thought it was the venture would be operating in five years, and whether success was contingent on them managing the business. Results showed that confidence in one's entrepreneurial skills was the key predictor of whether the entrepreneur decided to launch a business (Koellinger, Minniti and Schade, 2007).

Why do entrepreneurs hold optimistic perceptions of their ability? As outlined in the introduction, people tend to view themselves as better than average (aka 'the superiority illusion'). One reason is that when people make comparative judgments, they surprisingly fail to compare themselves to others; rather they focus on themselves (Dunning, Heath, and Suls, 2004). For instance, people think they can read better than average because they do not experience difficulties reading. They forget that other people do not either. In other words, they neglect the competition. Similarly, when entrepreneurs think about their chances of success, they think about their own skills without taking into account that others may have similar abilities (Camerer and Lovallo, 1999). To illustrate this point Camerer and Lovallo cite the former chairman of Walt Disney Studios. When asked why many movies open on the same weekend he said:*"If you only think about your own business, you think: I've got a good story department, I've good a good marketing department, we're going to go and do this. And you don't think that everybody else is thinking the same way."*

Self–focus and competition neglect also work in the reverse direction. If we experience difficulties with a task we tend to assume that we have lower than average abilities. For example, when asked to rate their comparative level of juggling, people perceived themselves to be below average because they are not good jugglers (Dunning et al., 2004). Of course, few people are good at juggling. In such domains, people underestimate their comparative abilities. This suggests that ventures that require relatively low–level skills (e.g., retail) will attract too many entrepreneurs, while ventures that require elaborated skills (e.g., bio–engineering) will attract too few people. Confirming this idea, one experimental study found that in fields where success was based on low–level skills the market was over crowded due

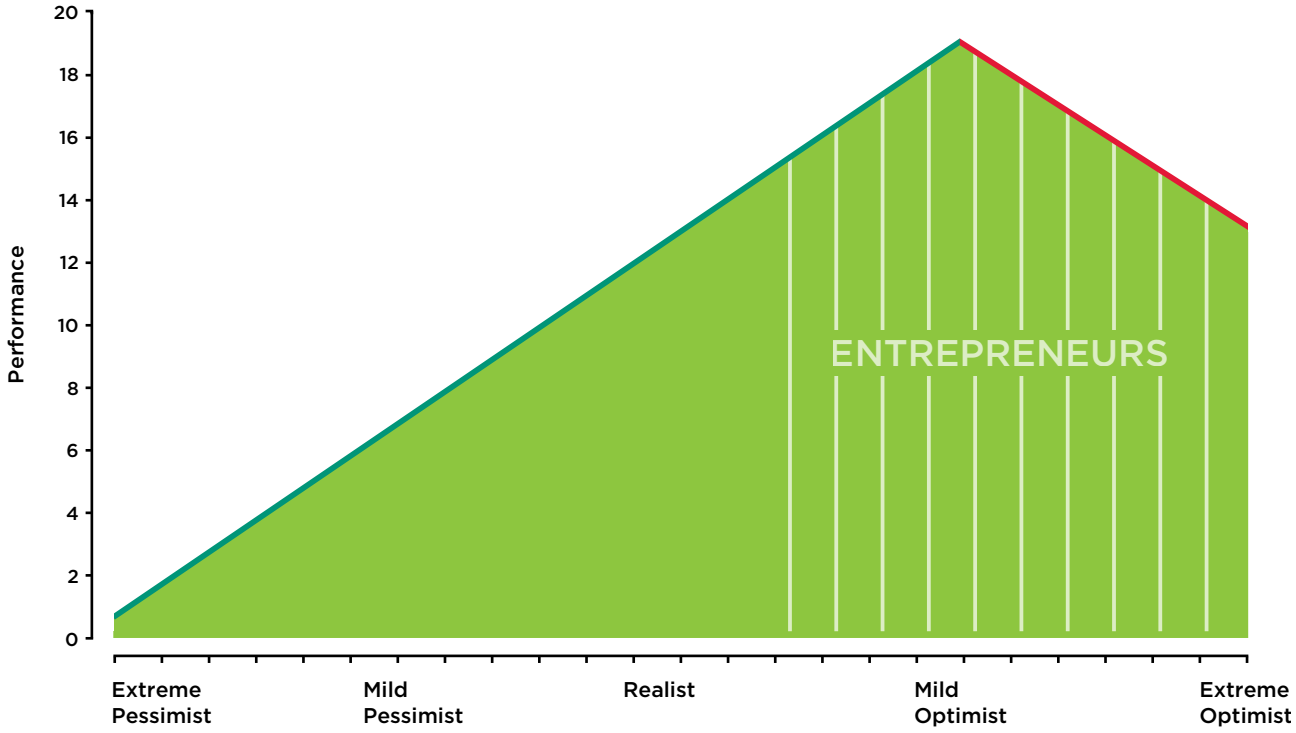
to overconfidence (Moore and Cain, 2004). However, when success was based on high–level skills, the market was under occupied due to under confidence. Interestingly, competition neglect suggests that market opportunities may be found in areas perceived to be difficult.

b. Overconfidence and success

Several studies have reported a negative relationship between the entrepreneur level of optimism and success. For example, using a large sample of entrepreneurs from 18 different countries, one study found that over–confident skill perceptions lead to lower business survival rates (Koellinger et al., 2007; see also Hmieleski and Baron, 2009; Simon and Shrader, 2012). Such results, however, can be misleading. As depicted in Figure 3, optimism in the general population is often positively related to success (depicted by the green line; for review see Sharot, 2011; Chang, 2002). People who display moderate or even high levels of optimism make better decisions than those with lower levels of optimism. However, for extreme optimists the relationship reverses – leaving extreme optimists worse off than moderate/high optimists (depicted by the red line). For instance, it has been reported that moderate optimists display prudent financial habits, whereas extreme optimists display hazardous ones (Puri and Robinson, 2007). Thus, the relationship between optimism and success is more accurately portrayed as an inverse U shape (possibly slightly skewed in a positive direction).

Given that most entrepreneurs are extreme optimists (see introduction), we have to be careful when interpreting studies that examine the relationship between entrepreneurial success and optimism. For example, a study that found optimism to be negatively related to entrepreneurial success, measured via revenue and employment growth, showed that the negative effects were driven by people with extreme optimism. While moderate levels of optimism are in fact helpful, extreme scores are hurtful (Hmieleski and Baron, 2009). Aptly put by the behavioral economists Puri and Robinson: optimism is like red wine, a glass a day can be good for you, but a bottle a day dangerous.

Figure 3. **Rose-coloured entrepreneurs: Entrepreneurs have above average optimism scores. The graph is a cartoon of the relationship between optimism and performance based on a theoretical integration of past studies. As shown, mild optimists tend to have the best performance. However, studies suggest that for more extreme optimism scores, the relationship reverses and performance decreases.**



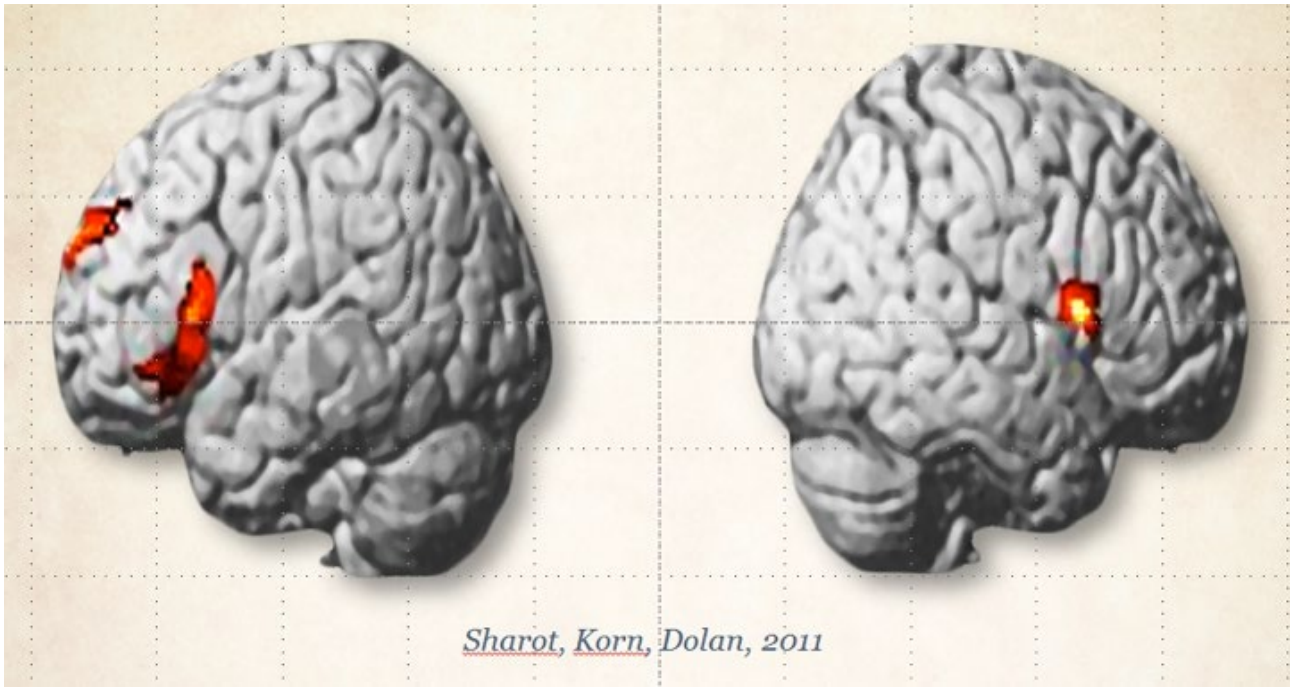
Such findings have led some to suggest optimistic entrepreneurs should be actively discouraged from starting ventures (e.g., Hayward et al., 2006; Lovallo and Kahneman, 2003; Simon, Houghton, and Aquino, 2000). However, if we would successfully reduce optimism and confidence in entrepreneurs, people may never have the courage to start a business (Busenitz and Barney, 1997; Townsend et al., 2010). Given the importance of entrepreneurs for economy and society, it would be harmful for the society to reduce optimism. Individual hubris might lead some entrepreneurs to commit painful mistakes, but on the societal level progression is created, turning entrepreneurs into 'optimistic martyrs' (Dosi and Lovallo, 1997). It is important to stress that being pessimistic about one's chances of success does not help entrepreneurs. Rather, pessimists rarely end up starting new businesses: they are protected from costly mistakes, but also unlikely to create successful new ventures.

C. Maintaining optimism in the face of reality

An enduring question is how entrepreneurs remain optimistic when faced with contradicting evidence. Our research has shown that people maintain optimism because they are more apt to learn from positive information about the future than negative information. When they receive unexpected desirable information (e.g., you are less likely to suffer cancer than you thought) they revise their beliefs accordingly, but in the face of undesirable news (e.g., you are more likely to suffer cancer than you thought) they tend to stick with prior beliefs. This bias is known as 'the good news–bad news effect' or the inclination to discount bad news. We have found

that the bias is a result of frontal regions of our brain accurately encoding and integrating unexpected positive information but failing to do so for negative information (Sharot, Korn and Dolan, 2011; see Figure 4). The more optimistic a person, the greater this neural bias.

Figure 4. **Activation in frontal regions when presented with unexpected positive (left side) and negative (right side) news, showing strong encoding of the former over the latter.**



Thus, if a person believes her business has a 70 per cent chance to survive five years and is then given bad news – that the objective likelihood is 50 per cent, she might not revise her belief much, possibly updating the estimate to 68 per cent. However, if she thinks her chances of convincing a certain investor to invest is 10 per cent and then gets good news – that the objective probability is 50 per cent, she will most likely alter her estimate quite a bit, may be to 33 per cent. Hence, even in the face of counter evidence people maintain positive expectations, which are at times unrealistic. Thus, teaching entrepreneurs about survival rates or growth might not lead them to change their predictions.

d. Summary

Entrepreneurs overestimate success due to a superiority illusion, competition neglect and the tendency to discount bad news. Such an overestimation increases the likelihood of an individual to decide and enter the market. While medium–high optimism is related to success extreme optimism may hinder it.

3. OPTIMISM AND PLANNING

a. The planning fallacy

In the year 1976 a small team of experts in Israel were developing a new high school curriculum for the Ministry of Education. After a year of working they met to determine how much time they required to finish the project. Each member wrote on a piece of paper the number of months they thought was needed. The predictions ranged from 18 months to 30 months. One of the team members then asked a fellow member, who was a distinguished expert in developing curriculums, to recall other teams just like them, at a similar stage. How long did it take those groups to develop their curriculum? After taking a long pause the expert told the group that 40 per cent of similar teams gave up on the project all together. As for the remaining 60 per cent, they completed the curriculum within seven years. The members wanted to know if the expert believed their team was exceptionally skilled and thus likely to finish the task sooner. The answer was no – the expert evaluated the abilities of the members to be slightly below average. Despite this sober evaluation the team remained highly optimistic that they would finish the project in less than three years. In the end, it took them eight.

One of the members on the team was Nobel Prize laureate Daniel Kahneman. He recounted this story when he and Amos Tversky introduced the planning fallacy (Kahneman and Tversky, 1979). The anecdote comprises all parts that constitute the planning fallacy. First, a team makes overly optimistic predictions for how long it will take to complete a task. Second, they learn the history of comparable tasks, which is rather pessimistic. Third, and this is the key part, they ignore this information and hold on to their overly optimistic outlook. This is yet another example of the powerful mechanism underlying the good news – bad news effect – the human tendency to discount undesirable information (Sharot, 2011). Upon receiving 'bad news' that does not align with overly–optimistic prior beliefs people fail to integrate the new information and remain optimistic.

A vast literature documents instances of the planning fallacy. For example, over the last 100 years public projects such as building a bridge or an airport have been characterised by an overrun in costs and time in both Europe (Flyvbjerg et al., 2005) and the United States (Engerman and Sokoloff, 2004). Industrial research and design projects are on average 250 per cent over time and 125 per cent over budget (Norris, 1971) and about 75 per cent of software projects are completed after the predicted date. The problem exists for a range of projects from those estimated to take a few days to years, and for budgets involving a few thousand pounds to millions (Buehler et al., 2010). Overly optimistic predictions are observed for parts of a project as well as the whole (Wilkes and Norris, 1971) and for projects that involve individuals or teams (Buehler et al., 1994; 1995).

One may argue that optimistic predictions are merely a tactic to deceive potential investors and persuade skeptics (e.g., Flyvbjerg et al., 2003). While there may be truth to this notion, studies show that even when tasks do not require support from others, people fall prey to the planning fallacy. For example, individuals express high confidence in the likelihood that they will file taxes, complete their Christmas shopping, or hand in assignments on time. Often such confidence is expressed immediately after recalling failures to complete these tasks on time in the past (Buehler et al., 2010). This suggests that the tendency to dismiss bad news

also appears when this news comes from our own past. Indeed, previous startup experience, whether in the same industry as a new venture or in another industry, does not improve accuracy of financial forecasts (Cassar, 2014; Casser, 2010). In fact, serial entrepreneurs do not provide more accurate forecasts than first time entrepreneurs (Landier and Thesmar, 2009).

b. Using the past to predict the future?

Why does past experience not mitigate planning biases? Extensive research on the planning fallacy suggests that people do not think that the past is relevant for planning (for a review, Buehler et al., 2010). Analysing the thoughts during planning revealed that most of the thoughts are related to the future, describing scenarios in which the task is completed without any problems (best–case scenario), but only a marginal percentages of the thoughts concerned problems or impediments (3 per cent), past experience (7 per cent), and other people's experience with the same task (1 per cent; Buehler et al., 1994). And even when people are forced to pay attention to the past, they exclude it thereafter in their planning for the future (Buehler and Griffin, 2003). In part, this is due to the way people explain past failures. When they are asked to explain why in the past they were late on a project, they use self–serving explanations that indicate the failure had something to do with transitory, very specific circumstances (e.g., the computer screen was 'frying' the essay; Buehler et al., 1994). However, when the same people explain the past failures of a person they know, they point to enduring personal problems with time management. For instance, when software engineers are asked if they use past experience to inform their plans, they responded that *"No... because it's a unique working environment and I've never worked on anything like it"* or *"No, not relevant. It's not the same kind of project at all"* (Buehler et al., 2010). For entrepreneurs, these findings suggest that when planning, they start off with a best–case scenario that does not entail problems, obstacles, or relevant experiences from the past. The motivation to finish quickly increases the optimistic nature of the plans further; directing attention away from potential obstacles and towards idealised best–case scenarios, (Buehler et al., 1997).

Ironically, making elaborated, specific plans may increase the planning fallacy. For instance, when people are instructed to make specific plans for when, where, and how they want to do their Christmas shopping, they become more optimistic about when they will have finished shopping compared to people who did not make specific plans (Buehler & Griffin, 2003). Elaborated planning increases the focus on best–case scenarios in which one step inevitably leads to another, thereby guiding attention away from potential obstacles. These considerations lead to a counterintuitive prediction; formal planning efforts may increase the planning fallacy (Cassar, 2010). Indeed, analysing data from about 400 nascent entrepreneurs revealed that the more entrepreneurs planned their financial future, the more optimistic their sales predictions were (Cassar, 2010).

c. Costs and benefits

Optimistic planning can have positive and negative effects on success. The amount of optimistic language, for instance, in a business plan was positively correlated with the amount of capital raised (James and Gudmundsson, 2012). This points towards the advantage of positive predictions for raising capital, even if they turn out to be inaccurate. Such optimistic predictions might help to convince investors to adopt the inside view of the entrepreneur, thereby buying into their forecasts. Outside observers are in general more likely to adopt an outside view that includes past experiences, potential problems, and base rates when evaluating forecasts, and they give little attention to, for instance, the motivation of the

person. However, when observers have a strong motivation themselves that for a person to finish the task as early as possible they are more likely to adopt a similar inside view as the planner, neglecting past experiences and potential obstacles (Buehler et al., 2010).

Another potential advantage of optimistic forecasts is that they could act as self–fulfilling prophecies. Early on, researchers found a positive correlation between optimistic predictions and the time needed to finish the task (e.g., Buehler et al., 1995). This is in line with research showing that specific, challenging goals produce the best outcomes (Locke and Latham, 2002). However, other studies found that manipulating predictions (more or less optimistic) did not affect behavior. Subsequent research started to distinguish between two different kinds of projects that are impacted differently by optimistic forecasts. On the one hand, there are personal projects that benefit from increases in self–control, motivation, and the specification of concrete goals. These personal projects benefit from optimistic predictions. On the other hand, there are projects for which no amount of motivation can make them less challenging or complex. For such projects, the optimistic nature of the prediction has no influence on performance. And indeed, research shows that for task less prone to depend on outside forces, optimistic predictions positively affect behavior (Buehler et al., 2010). However, for more complex tasks, predictions have no effect on behavior.

Despite the potential benefits of optimistic planning, the vast literature on the planning fallacy cites numerous examples of projects that failed or never got started because of overly optimistic forecasts (Buehler et al., 2010). For instance, poor time estimations are the main cause for failure of IT projects (Nelson, 2007) and the more optimistic a management forecast the more likely the venture is to fail (Mokowa and Sievers, 2013). Optimistic forecasts might, for example, indicate that an entrepreneur underestimated the competition (i.e., competition neglect), or did not prepare for potential obstacles or problems. Furthermore, entrepreneurs might invest too much of their money at an early phase of the startup based on optimistic predictions, running short of cash thereafter (Hayward et al., 2006). Investors, becoming increasingly aware that entrepreneurs are optimistically biased, attempt to identify ways to detect optimistically skewed forecasts before making costly mistakes (Mokowa and Sievers, 2013), and change their investment decisions accordingly (Landier and Thesmar, 2009).

d. Summary

Because the planning fallacy is known to increase with greater project uncertainty and with greater perceived rewards (Buehler et al., 1997), which are two characteristics of entrepreneurial projects, the planning fallacy is especially problematic for such ventures. Given the importance of accurate planning and forecasting for businesses, several methods have been developed to ‘debias’ planning (see Box 3).

4. OPTIMISM AND THE PROCESS TOWARDS INNOVATION

The process towards successful innovation requires not only effort, persistence and social support, but also confronts innovators with a paradoxical task: to remain optimistic while being mindful of potential obstacles (Kappes, Oettingen and Pak, 2012). In this section we examine how an optimistic disposition effects persistence, learning from mistakes, responding to stress, building professional networks and knowing when it is time to give up.

a. The bright side to persistence: more effort

"One of the benefits of an optimistic temperament is that it encourages persistence in the face of obstacles" (Kahneman, 2011). Indeed, ample research suggests that optimistic expectations promote effort and persistence (Kappes et al., 2012; Amor and Taylor, 1998). The belief that a goal is attainable increases motivation (Gollwitzer, 1990), which in turn makes people work harder (Carver and Scheier, 2002) and for longer hours (Ajayi–Obe and Parker, 2005). Even in the face of setbacks, optimists sustain confidence that their goals will be met. One study, for instance, found that business failure does not reduce the optimism of serial entrepreneurs (Ucbasaran et al., 2010). In fact, serial entrepreneurs who had experienced failure were as optimistic as entrepreneurs who just started their first business. A key reason for the maintenance of positive beliefs is the way optimist interprets events. Seminal work by the psychologist Martin Seligman has shown that optimists assign different reasons to good and bad incidents. When good things happen, let's say a functional prototype is built, the optimist tends to take credit believing that the prototype is successful because of personal (I did a good job), permanent (because I am a good engineer), general (and basically have highly developed mechanical skills) causes. In contrast, negative events, let's say producing a large number of the prototype was unsuccessful, are explained by external and specific causes (the machinery we used is no good) that are temporary (but it can be fixed). Believing negative events are temporary while positive events are due to permanent causes means that optimists believe positive outcome will occur again and again in the future, while negative outcomes can be overcome. Confidence is thus maintained, which helps people persist in their goal pursuit (Seligman, 1998)

b. The dark side to persistence: knowing when to quit

The problem with perseverance is that entrepreneurs may persist when backing down is in fact the optimal strategy. Consider the results of a study which examined inventors who paid $1,000 to receive advice from the Inventor's Assistance Program in Canada (IAPC) (Astebro, 2007). The IAPC analyses 37 factors to evaluate the likelihood of an invention being successful and advises inventors on whether or not to continue persuing the project. The IAPC analysis is highly predictive: inventions receiving the lowest scores by the IAPC never make it to the market, and those receiving the second to lowest usually have negative returns. Thus, the recommendation for such projects is not to pursuit further. The study showed that despite receiving such low scores, 30 per cent of the inventors continued to invest money, with 9 per cent still spending between 81 per cent and 100 per cent of their total fund, and 50 per cent invested more time in the project.

Importantly, the more optimistic the inventor, the more likely they were to invest money and time after being told to quit. Extreme optimists, even in the face of strong contradicting evidence, remain confident that if they invest resources they will be successful. Janoff–Bulmann and Brickman (1982) coined the phenomenon *"the pathology of high expectations"*: people with high optimistic expectations of success will fail to recognise when to stop, thereby draining their resources and holding on too long to unpromising technology ventures that do not achieve commercial success (Lowe and Ziedonis, 2006).

c. Responding to stress

Entrepreneurship is often accompanied by high levels of stress evoked by job–related insecurity and struggles to keep the business running smoothly and productively (Brennan and McHugh, 1993; Egan, 2012; Latham, 2009). How the entrepreneur responds to stress is important as stress can predict intentions of withdrawal (Pollack et al., 2012).

Optimism is helpful as it can buffer against subjective stress. Interestingly, the relationship between optimism and stress is bi–directional. First, believing that negative outcomes are less likely reduces stress and anxiety. Indeed, highly optimistic individuals report less subjective stress and release less cortisol into their system relative to pessimists in response to the same stressors (Joblin, Wrosch and Scheier, 2013; for a review, Carver et al., 2010). Second, less subjective stress can in turn prevent further dampening of future outlook because stress can enhance pessimism. In a recent study we have found that inducing stress in volunteers alters the way they process information regarding the future. Under normal conditions people update their beliefs more readily when they receive good news (such as *"you are less likely to go bankrupt than you thought"*) than bad news (such as *"you are more likely to go bankrupt than you thought"*), thus generating an optimistic outlook. However, under stressful conditions the bias is abolished and people process negative information more effectively than they did before, resulting in a more pessimistic outlook. Thus, individuals with a predisposition for optimism will remain calmer and more optimistic under high–stress conditions, which may lead to persistence and better performance.

d. Learning from mistakes

Experiences, whether good or bad, often provide opportunities for developing new skills and gaining knowledge. For instance, a failure to convince a potential investor to invest money can provide helpful information about how to improve the product, the sales pitch, or both. Some researchers have argued that if optimists attribute failure to causes that avoid self–blame (i.e. self–serving attributions) than they may fail to reap important insights (Dweck, 2002). For instance, if an entrepreneur blames the circumstances for a failed pitch (e.g., blaming the mood of the investor) s/he might not be able to identify their own wrong doings (for a review, Ucbasaran, Shepherd, Lockett, and Lyon, 2013). However, there is evidence that optimism is not related to such denial (Armor and Taylor, 1998). A series of studies showed that while remaining confident in their abilities and future success, optimists processed negative feedback more effectively than pessimists, and used that information to prepare themselves for upcoming challenges (Kappes et al., 2012). The optimistic view is not that success is plausible by virtue of magic. Rather that success is plausible because the person is able to positively control the outcome, and learning here is instrumental. Thus, by focusing their attention on the task at hand, optimists effectively process information without pondering on the potential implications of negative feedback for the self and the future. (Note, that the type of negative feedback and actual outcomes we are referring to here is different from the unconstrained information about future probabilities we refer to when talking about the good news–bad news bias).

A recent brain imaging study by Swedish cognitive neuroscientist Dr. Sara Bengtsson suggests that optimists might learn better because they do not expect to fail (Bengtsson, Dolan and Passingham, 2011). Bengtsson induced expectations of success in college students by priming them with words such as smart, intelligent and clever just before asking them to perform a test. To induce expectations of failure, she primed them with words like stupid and ignorant. The students performed better after being primed with an affirmative message. Examining the brain–imaging data, Bengtsson found that the students' brains responded differently to the mistakes they made depending on whether they were primed with the word clever or the word stupid. When the mistake followed positive words, she observed enhanced activity in the anterior medial part of the prefrontal cortex (a region that is involved in self–reflection and recollection). However, when the participants were primed with the word stupid, there was no heightened activity after a wrong answer. It appears that after being primed with the word stupid, the brain expected to do poorly and did not show signs of surprise or conflict when it made an error. A brain that doesn't expect good results lacks a signal telling it 'take notice — wrong answer' these brains will fail to learn from their mistakes and are less likely to improve over time. Optimists expect to do well and thus when they fail they are surprised, more likely to learn, and conclude that these lessons will make them even more likely to succeed in the future. Expectations become self–fulfilling by altering our performance and actions, which ultimately affects what happens in the future.

e. Building social networks

Social networks are important for making the decision to start a venture and running it successfully (e.g., Baron and Markman, 2003; De Carolis, Litzky and Eddleston, 2009). Large social networks increase the likelihood of discovering business opportunities, and strong relations with other entrepreneurs provide crucial information for maintaining a business (De Carolis, Litzky and Eddleston, 2009). Indeed, a recent meta–analysis of 61 independent samples with more than 13,000 entrepreneurs found that social capital positively predicted venture performance.

Optimism has been shown to increase social networks and support (for a review, Carver et al., 2010). This has been shown for entrepreneurs (De Carolis, Litzky and Eddleston, 2009) as well as the general population. For example, one study revealed that optimistic students increased their social networks during their first semester at university more than pessimistic students (Brissette et al., 2002). Another study found that optimists are able to generate greater support from social interactions (Srivastava, McGonigal, Richards, Butler and Gross, 2006). Interestingly, social networks in turn increase optimism (Segerstrom, 2007) presumably because greater social resources heighten positive expectations.

The main reason for the beneficial influence of optimism on social ties is that optimists are liked better. Interactions with optimists are experienced as more enjoyable than with people who are less optimistic (Helweg–Larsen, Sadeghian and Webb, 2002). Thus, people seek out optimists; expressing an interest in spending more time with them, befriending and collaborating with them (Helweg–Larsenet al., 2002). Optimism is not only a social magnet that enables people to build superior social support (Brissette et al., 2002), but can also act as a self–fulfilling prophecy (Srivastava et al., 2006). Specifically, in comparison to pessimists, optimists perceive their partners as providing more support, which leads them to invest more effort in maintaining the relationship. Increased effort then leads to more satisfaction with the relationship for both partners.

f. Summary

Entrepreneurs' optimistic disposition can be a great asset during the process of establishing a business. An optimistic disposition prompts people to work harder even when faced with obstacles, protects from stress, enhances learning from errors and mistakes, and acts as a social magnet. On the downside, extreme levels of optimism might lead entrepreneurs to persist too long with unpromising endeavors, wasting valuable resources.

CONCLUSION

In this review, we summarise and integrate research on how an optimistic disposition relates to entrepreneurship. We first review evidence suggesting that entrepreneurs are more optimistic than average and then show that this disposition affects all parts of the process from innovation to decision making, planning and implementation. Optimism is a crucial element from the very first step of the process, enhancing the likelihood of identifying a creative solution. This occurs by altering imagination and enhancing positive feelings, which broaden thought horizons. Optimistic forecasts heighten motivation, inspiring founders, investors and co–worker to invest resources and persist – crucial ingredients for success. However, optimistic beliefs often uphold despite accumulation of evidence indicating that successful implementation is unlikely, which can lead to suboptimal decisions. It is thus crucial to enhance awareness of the influence of optimism on the entrepreneurial process such that appropriate interventions can be developed to either buffer or enhance the influence of optimistic expectations on the steps towards innovation.

BOXES

BOX 1.

Optimism and the happiness of entrepreneurs

A host of research shows that optimistic people are happier and experience more positive affect as well as less negative affect than pessimistic people (for a review Carver, Scheier, and Segerstrom, 2010). The belief in one's abilities and chances of success, for instance, increases the conviction that one can actually achieve desired outcomes, leading to positive feelings of anticipation, excitement, and interest. Furthermore, feeling that failure is unlikely induces feelings of security and safety, while, at the same time, being protected from negative feelings of uncertainty or anxiety. Since entrepreneurs are more optimistic than people on average, are they also happier with their lives and more satisfied with their job? Data from 23 countries suggest that entrepreneurs are indeed more satisfied with their jobs than employees (Benz and Frey, 2008) and are more satisfied with their life in general (Binder and Coad, 2013). Most research points to higher independence and autonomy as an explanation for the happiness of entrepreneurs. Consistently, using a representative sample from the BHPS dataset, a recent study found that people who switched from being employed to being self–employed are more satisfied with their increased freedom at work and are happier overall (Binder and Coad, 2013). Furthermore, the more optimistic entrepreneurs are the more satisfied they are with their job (Cooper and Aartz, 1995). This finding is in line with substantial evidence for the idea that optimism boosts happiness – suggesting that optimism plays a part in entrepreneurs' high levels of satisfaction with their lives and their jobs.

BOX 2.

Experimental approaches to study market entry

Most of the studies in this review were correlational in their approach, as for example, detecting the relationships between optimism and market entry. To make causal conclusions, experimental approaches are needed which manipulate the variables. In one study, Camerer and Lovallo (1999) use such an approach to understand why and when people enter a competitive market. Participants played a game in which each had to decide independently whether or not to enter a market. Before making this decision, they learned the capacity of the market, which was smaller than the number of participants. If they decided not to enter the market, they received a certain amount of money (similar to staying employed). If they decided to enter the market, they could get more money if the number of entrants was less than the capacity of the market. However, if the number of entrants was, they lost money. The optimal behavior is to enter the market only if one expects the number of entrants to be lower than the capacity. People are surprisingly

good in finding an optimal equilibrium in this game even though they are not allowed to talk to each other (Kahnemann, 1988; Rapport, 1995). This is, unless the payoff depends on their skills.

In the Camerer and Lovallo study, the payoff depended on the rank of each of the entrants into the market. Hence, if you enter the market with a high rank you would receive money even if the capacity of the market was exceeded. On some rounds, participants learned that the rank was determined by chance, but on other rounds that the payoff depended on participants' skills. In one market with eight participants, for instance, the highest–ranked participant would earn $33, the next highest would win $17, and everyone else would lose $10. For the skill–based rounds, players should enter the market either if they think few others would enter the market, or if they think that their skill is superior. To measure the forecast for market entry, participants forecasted privately before each round the number of entrants. To measure their skill, participants played a trivia game at the beginning of the study. However, they did not learn about their skill rank until after the experiment – they had to rely on their confidence in their skills. Such a situation resembles the market of new ventures, in which the entrepreneurs do not learn about their competitive advantage until after they entered the market, and thereby have to rely on their confidence. The results showed that skill–based rounds disrupted the optimal equilibrium. In the chance rounds, the overall profit of the markets was positive – the average player was profitable 77 per cent of the time. In contrast, on skill rounds, the overall profit of the markets was negative – the average player was profitable only 40 per cent of the time. When people believe that skill will determine their outcome, they were more likely to enter a market, creating unprofitable markets. Entrepreneurs not only enter a skill–based market, they enter a market in which everyone else thinks that they have exceptional skills. Including such a selection process into the experiment increased the effects of skilled–based market entry: the effects were about three times larger. Now, the average player was profitable 6 per cent of the time, and thus lost money at 94 per cent of the time.

BOX 3.

Debiasing planning

Most of the techniques for debiasing planning fallacies focus on applying an outside view to planning instead of an inside view. One method, for instance, requires forecasters to base their predictions on the outcomes of similar projects (Lovallo and Kahneman, 2003). If, for instance, you want to predict the success of a movie, you should select a class of movies with similar budgets and actors to base your prediction on. Once a reference class is selected, you should look at the distribution of the outcomes to see which the most likely outcome is and what outcomes are rare. Once this data is in place, you should make a prediction which, however most likely will still be biased. Hence, now you have to debias the prediction by taking into account your prediction ability. If data is available of past predictions and outcomes, your prediction ability can be calculated. If not, one should refer to the average prediction ability (i.e., correlation between prediction and outcome) in other fields and apply them. Once the average outcomes of similar projects,

your biased prediction, and the prediction ability are known, a best guess prediction can be derived from these numbers. Research on this method showed that it is effective in reducing unrealistic optimism (Flyvberg, 2008; Flyvberg et al., 2009).

At times, data of past experience does not exist. Based on past research, several recommendations are derived. First, one should ensure that obstacles and problems are included when constructing likely scenarios. Kahneman and Klein (2009) suggest a method, first introduced by Gary Klein, to secure that obstacles get enough attention, labelled pre–mortem. Here, people involved in the forecasting should meet and imagine that they have implemented the plan, which unfortunately failed. Now, everyone should write out a scenario to explain how the disaster happened. This method shifts attention towards obstacles and enhances the likelihood of pessimistic views to be expressed. Second, it has been suggested that consulting outside advisors can help to identify skewed forecasts. Third, it has been advised to segment projects into many steps, which should increase awareness of potential obstacles and the time needed to complete each step (Kruger and Evans, 2004).

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