BEHAVIOURAL FINANCE, ENTREPRENEURIAL COGNITION
AND SME FINANCIAL MANAGEMENT

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Abstract
The principal purpose of this review article is to discover what insights on the financial management of small and medium-sized enterprises the rapidly emerging field of Behavioural Finance can provide. The evolution of Behavioural Finance as a scholarly field is first reviewed. Thereafter, the growing literature in the relatively new field of Entrepreneurial Cognition is also reviewed. The paper culminates in examining the financial management of small and medium-sized enterprises through the combined lenses of Behavioural Finance and Entrepreneurial Cognition. The paper closes with recommendations for further scholarly inquiry into the financial management of small and medium-sized enterprises.

Looking out at the world through completely rational eyes, entrepreneurs might well never get started – the odds would appear, realistically, far too daunting.

Baron (1998, p. 290)

Introduction
The principal purpose of this review article is to discover what insights on the financial management of small and medium-sized enterprises (SMEs) the rapidly emerging field of Behavioural Finance can provide. A central concern of Behavioural Finance is the degree of rationality of realistic, as opposed to idealised, financial agents, and how this impacts upon their decision-making practices and behaviours. Behavioural Finance introduces the possibility that, in their real world decision-making, financial agents are less than fully rational and they employ heuristics and exhibit certain systematic cognitive biases that together lead to significant departures from the tenets of Modern Finance Theory. If SME financial management is to be considered from a Behavioural Finance perspective, it is necessary to establish that decision-making heuristics and cognitive biases are typically employed or exhibited by SME owner-managers. For such evidence, the paper draws on a growing literature in the relatively new field of Entrepreneurial Cognition which is at the scholarly intersection of entrepreneurship and cognitive psychology.

The structure of the paper is as follows. In the following section, a background review of the evolution of Behavioural Finance is presented. The literature on Entrepreneurial Cognition is then reviewed to the point of
establishing that decision-making heuristics and cognitive biases have been empirically observed amongst SME owner-managers. Thereafter, brief descriptions are provided for the decision-making heuristics and cognitive biases that have been observed. The paper culminates in examining the financial management of SMEs through the combined lenses of Behavioural Finance and Entrepreneurial Cognition. The paper closes with recommendations for further scholarly inquiry into the financial management of SMEs.

**Behavioural Finance**

Modern Finance Theory (MFT), as presented in textbooks and taught in universities around the world, has evolved over more than 50 years. Seminal works in the earlier stages of this evolution include Dean (1951) on capital budgeting, Markowitz (1952, 1959) on portfolio theory, Modigliani and Miller (1958, 1963) on capital structure decisions, Miller and Modigliani (1961) on dividend policy decisions, Sharpe (1964) and Lintner (1965a, 1965b) on capital asset pricing, Fama (1970) on capital market efficiency, Black and Scholes (1973) on option pricing, Jensen and Meckling (1976) on agency theory, Ross (1976) on arbitrage pricing theory, and Leland and Pyle (1977) on signalling theory. MFT is in great part normative and, primarily for reasons of tractability, much of it rests on strong assumptions regarding perfect capital markets and the strict rationality of financial agents.

The theoretical advances identified in the previous paragraph, some of which ultimately resulted in Nobel prizes for their proponents, were followed by a burgeoning of empirical studies intended to test their validity in a less than perfect world. By the end of the 1970s, there emerged a growing dissatisfaction with the state of MFT. For example, so inconclusive had become theoretical and empirical perspectives on such significant elements of MFT as capital structure decisions and dividend policy decisions that they were styled ‘puzzles’ by leading finance scholars (Black, 1976; Myers, 1984). Perhaps reflecting a collective escalation of commitment bias and/or status quo bias, theoreticians nevertheless tended to dismiss challenges to the explanatory power of their elegant models as mere anomalies that further research would eventually resolve.

Notwithstanding such defences, a widely-held belief emerged that ‘finance consists of theories for which there is no evidence and empirical facts for which there is no theory’ (De Bondt and Thaler, 1995, p. 386). Drawing attention to the essence of the dilemma, De Bondt and Thaler (1995, p. 387) go on (emphasis added):

. . . the problems with modern finance theory are created by its presumed dual purpose, characterizing optimal choice and describing actual choice. The validity of the theory for the first purpose is not in question. However, since it is assumed that actual people do optimize (or behave as if they did), the theories are also thought to be good descriptive models. Of course, if people fail
to optimize, this is not the case. The solution is to retain the normative status of optimization (e.g.,
teach students to maximise expected utility and to use Bayes’ rule) but develop explicitly
descriptive models of behavior in markets and organizations. *We call this effort behavioral finance.*

Thus, Behavioural Finance (BF) emerged in the 1980s amid growing discontent with the then existing
models of MFT, largely stemming from the lack of realism in the assumptions on human behaviour underpinning
these models. In the words of Statman (1999, p. 19):

> . . . today’s standard finance is so weighted down with anomalies that reconstructing financial theory
along behavioral lines makes much sense.

So far has BF progressed over the last two decades that it now has the customary accoutrements of an established
scholarly field, with the formation of the Institute of Behavioral Finance in 1998 and the establishment of the
Journal of Behavioral Finance in 2000. Detailed reviews of the development and precepts of BF are provided
Statman (1999), Schleifer (1999), Hirshleifer (2001), and Barberis and Thaler (2003). The seminal work in the
field is generally recognised to be De Bondt and Thaler (1985).

BF examines financial phenomena through the dual lenses of finance and of cognitive psychology.
Cognitive psychology focuses directly on the cognitive mechanisms through which individuals acquire, store,
transform and use information (Baron, 2004a). It directs attention to key aspects of human behaviour such as
decision making, problem solving and self-regulation of behaviour (Baron, 2004b). It also gives consideration to
how individuals make sense of the environment in which they exist. Statman (1999, p. 19) draws attention to a
misconception regarding BF:

> Some people think that behavioral finance introduced psychology into finance, but psychology was
never out of finance. Although models of behavior differ, all behavior is based on psychology.

The psychological foundations of BF are provided by the pioneering experimental research on human decision-
(1972, 1973, 1979, 1984). The principal thrust of this and subsequent research is to challenge the strict
rationality assumptions of MFT and to introduce the possibility that, in their real world decision-making,
financial agents are less than fully rational (said to be quasi-rational) and they employ heuristics and exhibit
certain systematic cognitive biases that together lead to significant departures from the tenets of MFT.

Buchanan and Huczynski (2004, p. 762) define heuristics as ‘simple and approximate rules, guiding
procedures, shortcuts or strategies that are used to solve problems’. Haley and Stumpf (1989) draw attention to
numerous heuristics, or rules-of-thumb, that individuals use to make decisions. They indicate that heuristics influence the alternatives that decision-makers generate, select and evaluate. Heuristics are used as filtering and organising devices, thereby reducing the complexities of decisions and speeding up the decision process in the face of considerable uncertainty and ambiguity. Heuristics may quickly yield acceptable solutions to problems in an effective and efficient manner and are therefore very economical, especially in terms of information requirements. The use of heuristics has also been associated with faster learning and innovativeness in the sense of generating new insights into unsolved problems and opportunities. While helpful in many situations, it must be recognised that, in the face of considerable uncertainty and ambiguity, heuristic-based logic can lead to severe errors and systematically biased decisions (Wright et al., 2000).

Buchanan and Huczynski (2004, p. 762) define a cognitive bias as a ‘prejudiced predisposition or a systematic distortion’ when making decisions. As subjective or predisposed opinions, biases operate at the subconscious level, are difficult to detect, and they have a potent and immediate impact upon an individual’s judgement. Although biases help individuals to cope with their cognitive limitations, they may result in less rational, less comprehensive decision-making because they systematically violate the laws of probability. Biases may not only distort perceptions of likely outcomes, but also distort perceptions of the risk or uncertainty associated with those outcomes. In other words, biases cause individuals to overestimate the reliability and validity of information, to draw incorrect conclusions, and to give information too much or too little weight. The decision situations in which cognitive biases are more likely to be exhibited include (inter alia) information overload, high uncertainty, great complexity, considerable ambiguity, high novelty, strong emotions, time pressure and fatigue – all circumstances that may more acute in SMEs than in larger concerns (Baron, 1998).

Because individuals are generally unaware that they exhibit biases, it is argued that it is extremely difficult to eliminate the impact of biases upon decision-making (Barberis and Thaler, 2003).

In a review article on BF, Thaler (1999, p. 16) indicates ‘I would like to see more behavioral finance research in the field of [financial management]. Most of the research so far has been in the field of asset pricing; much less has been done on [financial management]’. Thaler (1999) cites Stein’s (1996) work on capital budgeting in an irrational world as an example of the type of research needed. Heaton (2002, p.33) has more recently indicated that ‘little work in [financial management] has dropped the assumption that managers are fully rational’. He identifies Roll (1986) on managerial overconfidence and takeovers, De Meza and Southey (1996) on managerial optimism and entrepreneurship, and Boehmer and Netter (1997) on managerial optimism and corporate acquisitions as notable exceptions. Heaton (2002) himself has conducted research on managerial
optimism and corporate financial management. Other examples of the application of BF to the study of financial management are Shleifer and Vishny (1990) on corporate investments; Shefrin and Statman (1984), Frankfurter and McGoun (2000), and Frankfurter et al. (2002) on corporate dividends; Ritter (1991), Loughran (2002), Owen (2002), Burton et al. (2003), and Mohan and Chen (2004) on initial public offerings; and Sayrak and Shukla (2005) on corporate governance. Thus, while a start has been made, there would still seem to be need for re-examining the challenges of financial management through the fresh perspective offered by BF.

**Entrepreneurial Cognition**

If SME financial management is to be considered from a BF perspective, it is first necessary to establish that decision-making heuristics and cognitive biases are typically employed or exhibited by SME owner-managers. For such evidence, one can draw on a growing literature in the relatively new field of Entrepreneurial Cognition (EC) which is at the scholarly intersection of entrepreneurship and cognitive psychology. Forbes (1999) provides a comprehensive literature review of this field covering the period 1983 to 1998. This review has been supplemented by an overlapping search of the contents of leading SME research journals: *Journal of Business Venturing, Entrepreneurship Theory and Practice, Journal of Small Business Management, Small Business Economics, International Small Business Journal*, and *Entrepreneurship and Regional Development* from 1990 to 2005.

Like the evolution from MFT to BF, EC represents a paradigm shift in psychological research into SMEs which had its beginnings in the 1980s. Over the preceding two decades psychologists had been preoccupied with identifying characteristic and enduring personality traits of entrepreneurs such as need for achievement, locus of control, tolerance for ambiguity, and risk taking propensity. Much research effort was devoted to discovering how these traits set entrepreneurs apart from other financial agents, most often managers in large businesses and/or owner-managers of non-growth oriented SMEs. By the 1990s a broad consensus had emerged that the entrepreneurial personality research had achieved very little (Brockhaus and Horwitz, 1986; Low and MacMillan, 1988; Shaver and Scott, 1991; Manimala, 1992; Busenitz and Barney, 1997; Keh et al., 2002; Mitchell et al., 2002), and that the focus needed to shift to ‘what the entrepreneur does, not who the entrepreneur is’ (Gartner, 1988, p. 21). The EC framework facilitates this change of focus.

In an attempt to delineate the emerging field of EC, Mitchell et al. (2002, p. 97) propose the following definition:
entrepreneurial cognitions are the knowledge structures that people use to make assessments, judgments, or decisions involving opportunity evaluation, venture creation, and growth. In other words, research in entrepreneurial cognition is about understanding how entrepreneurs use simplifying mental models to piece together previously unconnected information that helps them to identify and invent new products or services, and to assemble the necessary resources to start and grow businesses.

According to Wright et al. (2000, p. 592), EC entails ‘the more extensive use of heuristics and individual beliefs that impact decision making’. Manimala (1992) identifies over 180 highly specific heuristics that may be employed by SME owner-managers.

Baron and Ward (2004) draw attention to the following research questions that have long been of interest to entrepreneurship scholars and which EC may be able to address with new insights:

- Why do some persons but not others choose to become entrepreneurs?
- Why do some persons but not others recognise opportunities for new products or services that can be profitably exploited?
- Why are some entrepreneurs so much more successful than others?

Furthermore, Baron and Ward (2004) recognize a number of research issues that have been or could be tackled in an EC framework including:

- Are the cognitions of entrepreneurs different from those of other business professionals? In other words, do they think differently in various ways, both with respect to the content of their thoughts and the processes they employ?
- Do entrepreneurs prefer heuristic thinking to the analytical or systematic thinking usually employed by managers of larger organisations?
- What role do cognitive biases and errors play in the thinking of entrepreneurs?
- What cognitive processes are involved in opportunity recognition?

Baron and Ward (2004, p. 557) conclude that ‘Research in entrepreneurial cognition has investigated a very broad range of issues and topics and has generally found that cognitive factors play an important role in key aspects of the entrepreneurial process’.

Forbes (1999, p. 415) indicates that ‘the effects of managerial cognition are likely to be more direct and immediate in new venture settings than in the context of larger, more established organizations’. Forbes (1999) gives two main reasons for this. First, new ventures are usually created under conditions of high uncertainty and ambiguity; and it is in just such circumstances that issues of central concern to cognitive psychologists like
perception, information acquisition and decision-making are particularly relevant. Second, because new ventures typically have small numbers of managers arranged in relatively flat organisation structures, their decision-making processes are likely to be relatively more influential than those of managers in larger organisations.

Wright et al. (2000, p. 593) concur with Forbes (1999):

... we contend that entrepreneurs use a heuristic-based approach to decision making more extensively, and this enables them to make sense out of uncertain and complex situations more quickly, often leading to faster learning and unorthodox interpretations (innovations). The more extensive use of heuristics by entrepreneurs allows them to navigate more readily through a wide array of problems and irregularities inherent in the development of new opportunities.

In the relevant literature, there is a strong view that an EC orientation or mind-set is essential to the effective management of SMEs. For example, Alvarez and Busenitz (2001, p. 758) point out that:

Given the high ambiguity and uncertainty that entrepreneurs typically face in the pursuit of a new venture, the willingness and confidence to readily rely on heuristics to piece together limited information to make convincing decisions may be virtually the only way to progress forward.

Heuristic-based logic is seen as vital to being able to exploit brief windows of opportunity open to SME owner-managers (Alvarez and Busenitz, 2001; Ucbasaran et al., 2001). According to Busenitz (1999, p. 337), ‘Without using biases and heuristics extensively, most new ventures would never get launched’. Apparently, entrepreneurs with an EC orientation often see new opportunities where others are preoccupied with protecting themselves from emerging threats. Learning may also have some important links to the use of heuristics in decision-making. It seems that those who use a heuristic-based logic not only make faster decisions, but they also learn more quickly (Alvarez and Busenitz, 2001). For these reasons, Wright et al. (2000) and Alvarez and Busenitz (2001), amongst others, are of the opinion that an EC orientation can be a source of sustained competitive advantage in SMEs.

A particularly important issue in both entrepreneurship and financial management is attitudes to bearing risk. Earlier personality trait based research has revealed that, contrary to popular opinion, entrepreneurs are only moderate risk takers and are no different to the broader population in this respect (Brockhaus, 1980; Brockhaus and Horwitz, 1986). Research studies in the field of EC have found similar equivocal attitudes to risk taking amongst entrepreneurs. For example, the central thesis in Palich and Bagby’s (1995, p. 429) study is:

... although entrepreneurs are widely considered to be risk-takers, their business-related behaviours may be the result of their unique perceptions from systematic differences in cognitive processes, not a desire to pursue ventures because they are risky per se. Therefore, their propensity for risk should be no different from that of nonentrepreneurs, even though their perceptions of the differences in internal
strengths and weaknesses, external opportunities and threats, and performance improvement versus deterioration will be skewed towards optimism.

In other words, EC research suggests that entrepreneurs do not have a higher risk taking propensity than other business people. However, because of their greater susceptibility to cognitive biases such as overconfidence, excessive optimism and illusion of control, entrepreneurs may have lower risk perceptions than others (Palich and Bagby, 1995; Busenitz, 1999; Simon et al., 1999; Keh et al., 2002). Entrepreneurs may be seen as accepting risks because they do not expect that they will have to bear them (Low and MacMillan, 1988). In fact, as the high SME failure rate suggests, entrepreneurs end up facing substantial risk when establishing and growing new ventures.

Referring to Table 1 which summarises research in the area of entrepreneurial cognition over the last two decades, decision-making heuristics it is believed are employed or that have been found to be used in SMEs are as follows (empirical evidence in bold):

- **Representativeness** – Busenitz and Barney (1997), Busenitz (1999)
- **Framing** – Mowen and Mowen (1986), Palich and Bagby (1995), Baron (2004b)
- **Counterfactual thinking** – Baron (1998), Baron (1999), Markman et al. (2002), Gaglio (2004), Baron (2004b)

Again referring to Table 1, cognitive biases it is believed are exhibited or that have been found to prevail in SMEs are as follows (empirical evidence in bold):

- **Sample size neglect** – Busenitz and Barney (1997), Busenitz (1999), Simon et al. (1999), Keh et al. (2002), Simon and Houghton (2002), Baron (2004b)
- **Illusion of control** – Simon et al. (1999), Keh et al. (2002), Simon and Houghton (2002), Baron (2004b)
- **Escalation of commitment** – McCarthy et al. (1993)
- **Aversion to regret** – Baron (1998), Baron (2004b)
- **Planning fallacy** – Baron (1998), Keh et al. (2002), Baron (2004b)
• Self-serving bias – Baron (1998)
• Confirmation bias – Baron (2004b)
• Sunk cost fallacy – Shepherd and Zacharakis (2000), Baron (2004b)
• Endowment effect – Shepherd and Zacharakis (2000)

In the following section of the paper, brief descriptions are provided for those decision-making heuristics and cognitive biases for which empirical evidence is identified above.

**Decision-Making Heuristics and Cognitive Biases**

Decision-makers employ the *representativeness heuristic* when they generalise about a person or an event based on only a few attributes of that person or only a few observations of similar events. Representativeness relies upon being able to discern similarities between the specific attributes of given instances and the defining attributes of classes of such instances. Thus, judgements are made on the basis of how well circumstances represent or match particular stereotypes that have emerged from past experience. While the representativeness heuristic can be helpful, it is associated with some significant biases:

- **Base rate (or prior probability) neglect** which causes individuals to behave in a manner inconsistent with strict rationality. In tackling their present circumstance, they persistently ignore base rate information associated with similar situations in the past, about which a considerable amount may be known. Instead, they tend to focus on outcomes in the immediate past in reaching decisions, disregarding older information such as long-run averages or statistical odds that may be relevant.

- **Sample size neglect** (or belief in the law of small numbers) which causes individuals to generalise from small, non-random samples. This bias is evident when individuals use a limited number of information inputs to draw firm conclusions about a much larger population. The most common type of small, non-random sample used as a basis for generalisation is the personal experience of an individual decision-maker. Clearly, a small non-random sample may not adequately represent the population and insensitivity to the limitations of small samples violates statistical rules in systematic ways. Furthermore, small samples can contain a disproportionate number of successes because failures are less likely to be well publicised and remembered. Even if individuals gather feedback through an impartial process, the smaller the sample, the greater the chances of receiving only positive information. This suggests that sample size neglect may *(inter alia)* affect one’s perception of risk.
Employing the representativeness heuristic can impair the ability of individuals to discriminate opportunities from background noise. A circumstance that has unique characteristics may nevertheless be judged and classified by its stereotypical qualities, and an opportunity may be lost. Thus, representativeness assures that stereotyped thinking prevails.

The framing heuristic focuses attention upon the way a problem is presented to a decision-maker and/or on how the decision-maker chooses to think about the problem (referred to as mental accounting). In other words, regard has to be paid to how the problem is framed. Experimental studies have found that the framing of a decision can have a profound effect on the ultimate choice that is made. For example, it can make a significant difference to a decision outcome if the problem is framed in terms of losses as opposed to gains. BF finds that people appear to have a greater sensitivity to losses than to gains. Individuals tend to be risk averse with respect to gains but risk seeking with respect to losses (referred to as loss aversion). It is an important feature of BF that it can accommodate the effects of problem description or framing. MFT cannot deal with the impact of framing because a principle of rational decision-making is that choices should be independent of the problem description or representation. In MFT, broad framing is considered essential to rational decision-making. However, research has revealed that individuals tend to frame risky decisions narrowly, possibly as a means of dealing with complexity and/or uncertainty. Thus, they deal with one decision at a time; with little attention being given to connections between decisions at a particular time or over a period of time. This explains (inter alia) the finding that individuals do not evaluate risky alternatives in a portfolio context.

The counterfactual thinking heuristic arises from a tendency of individuals to dwell on the past, imagining what might have been if they had made different decisions or acted differently or if the circumstances had been different. Research has revealed that such mental simulations of events that never occurred can have strong effects upon an individual’s emotional state, and upon his or her learning process. Typically, an individual engaging in counterfactual thinking focuses on imagined outcomes better than those actually obtained. This can result in intense feelings of disappointment and regret which colour the individual’s perceptions of past achievements and future opportunities, and which are likely to impact upon his or her future decisions and behaviour. It appears that the nature of the regret experienced changes over time. With respect to recent events, individuals’ tend to regret actions and decisions that yielded disappointing results. In the longer term, however, regret tends to focus on actions and decisions which were not undertaken and which represent missed opportunities. Aversion to regret – the pain felt when it is found out, too late, that different choices would have led to better results – is frequently recognised as a separate bias.
Counterfactual thinking can enhance an individual’s experiential learning by improving understanding of the likely causes of particular events or outcomes. By imagining events and outcomes that did not occur, an individual often gains insights into the factors that resulted in the events and outcomes that were actually experienced. Such insights may contribute to improved performance by suggesting better strategies, increasing the expectation of positive results, and increasing feelings of personal control. Overall, then, evidence suggests that counterfactual thinking can produce both benefits and costs, with the possibility that the benefits in terms of learning may exceed the costs.

The widely observed overconfidence bias arises when individuals tend to overestimate the correctness of their initial estimates when answering moderate to difficult questions or when dealing with ill-structured decision situations. Because of their overconfidence, they do not revise their initial estimates even after receiving new information. From a statistical viewpoint, overconfidence is evident when the confidence intervals individuals assign to their estimates are far too narrow and/or they are poorly calibrated when estimating probabilities so that events they think are certain occur less frequently than they should and events they believe are impossible happen more frequently than they should. Individuals exhibiting overconfidence tend to treat their assumptions as facts and do not see uncertainty associated with conclusions stemming from those assumptions. They may therefore erroneously conclude that a certain action or decision is not risky. It has been argued that overconfidence arises from a lack of meta-knowledge, meaning that individuals are unaware of the limits of their knowledge and therefore they are overconfident when making forecasts. In other words, individuals are claimed to not know what they don’t know. Research has shown that some classes of individuals exhibit higher levels of overconfidence than others. Moreover, it appears that individuals are more confident of their predictions in fields where they have self-declared expertise.

The pervasive excessive optimism bias is exhibited when an individual systematically overestimates the probability of a favourable outcome and/or systematically underestimates the probability of an unfavourable outcome. Considerable empirical evidence suggests that most people have unrealistically rosy views of their abilities and prospects, and they are therefore excessively optimistic about future events. Several factors contribute to this phenomenon: positive self-evaluations, high personal commitment, and a strong sense of control. Thus, excessive optimism is associated with the tendency of individuals to have a high personal regard for their own abilities or competence, regardless of objective evidence to the contrary. Individuals are more optimistic about outcomes when they are fervently committed to achieving those outcomes because their wealth, reputation, employability, etc. would otherwise suffer. Finally, greater optimism can result when individuals
believe, rightly or wrongly, that they can exercise effective control over their activities and plans, thus diminishing the perceived risk of failure (see illusion of control bias below).

Excessive optimism may have both beneficial and harmful consequences. On the beneficial side, it may aid in maintaining a relatively high level of self-esteem. Furthermore, the illusion of invulnerability resulting from excessive optimism may reduce anxiety and enable individuals to function without being overcome by trepidation or fear. On the harmful side, excessive optimism may cause perceptions of risk to be lower, thus discouraging an individual from taking precautions to avoid adverse outcomes. Research has shown that excessive optimism is quite resistant to de-biasing interventions such as awareness raising and advice.

The illusion of control bias arises when an individual overemphasises the extent to which his or her skill can increase performance in situations where chance plays a large part and skill is not necessarily the deciding factor. Individuals exhibiting illusion of control have a greater expectancy of success than objective probability would suggest because they believe their skills are more highly developed than those of others. Thus, an illusion of control can contribute to an excessive optimism bias. There are two main reasons for the illusion of control bias. First, individuals are motivated to control their environment and they derive personal satisfaction from belief in their own competence in accurately predicting and controlling the outcome of uncertain future events. Second, it is frequently very difficult to ascertain whether a particular outcome is a consequence of exercising skill or simply a chance occurrence, or a combination of both. Individuals exhibiting an illusion of control do not respond differently to controllable and uncontrollable circumstances. The illusion of control reduces the anxiety experienced in the face of uncertainty and may cause the individual to underestimate the level of risk faced because they believe their skills can prevent negative outcomes.

The escalation of commitment bias refers to the tendency, under certain conditions, for an individual who has made an initial decision to become overly committed to the original choice despite negative feedback; and to make further decisions that are biased by this commitment. Thus, escalation of commitment results in a determination to further pursue a course of action when the available evidence suggests that this is not appropriate. There are several factors that heighten escalation of commitment. First, research suggests that the more negative the feedback the greater may be the commitment. It appears that an individual in these circumstances is prone to engage in self-justification. Second, the more responsible for the initial decision an individual feels the more likely it is he or she will view reversing the decision as backing away from such responsibility. Third, escalation of commitment may be greater when the decision-maker is overconfident. Fourth, the more cognitive effort and skill the initial decision entailed the more reluctant might the decision-
maker be to begin the process over again. Fifth, the greater the visibility of the initial decision to external parties the more likely the individual is to attempt to avoid loss of face by admitting failure to others. It appears that learning ultimately does take place and escalation of commitment may disappear after several trials and prolonged negative feedback.

The **planning fallacy** is a bias which reflects the general tendency of individuals to overestimate the amount that they can achieve in a specific time; or alternatively, underestimate the amount of time that will be necessary to complete a specific task. The planning fallacy arises because individuals tend to ignore past situations and experiences with similar characteristics when making predictions about future outcomes. They are also inclined to treat the current situation as if it is unique and full of uncertainties, thus rendering past situations and experiences irrelevant. If they have been late in completing tasks in the past, they often blame it upon external factors beyond their control.

The **sunk cost fallacy** is one of the most common of decision-making biases which occurs when individuals allow their choices between future alternatives to be influenced by costs incurred at some time in the past which will be unchanged. MFT holds that only incremental costs and benefits should affect decisions about future events, and that taking account of sunk costs is irrational. It appears that sunk costs increase an individual’s aspiration level – the outcome anticipated in accordance with inputs. Those who have invested in sunk costs perceive outcomes below the aspiration level as being more negative. Sunk costs also cause individuals to be more risk seeking than they would have been if they had not incurred these costs.

The **endowment effect** is a bias which reflects the propensity of individuals to value what they have more highly than they would an opportunity to newly acquire the same good. Assuming no information advantage, MFT holds that ownership of an asset should not affect its valuation. However, BF provides an explanation for the endowment effect in terms of loss aversion. When a person owns an object its loss has greater magnitude than the value exchanged when the identical object is gained from the market-place. The endowment effect has been found to increase with the duration of ownership. The BF literature suggests that the relationship between ownership and value is moderated by the amount of sunk costs and how the object was obtained. It appears that attachment to an object depends on whether it was obtained by one’s own efforts or by a chance outcome. Unearned or windfall gains are not seen to be as valuable as earned gains, and are therefore more readily spent or gambled.

Collectively, the decision-making heuristics and cognitive biases described above presage a marked departure from the strict rationality assumptions of MFT in the financial management of SMEs. Owner-
managers employing these heuristics and exhibiting these biases can be said to be quasi-rational, by which Thaler (2000, p. 136) means ‘trying hard but subject to systematic error’.

**SME Financial Management**

Financial management is concerned with understanding factors that determine the value of a business’s uncertain cash-flows over time, and with management of these factors through careful financial planning and control and sound financial decision-making. The temporal patterns of cash-flow and risk encountered are the outcome of purposeful decision-making on the part of those charged with financial management of the enterprise’s affairs.

The broad objective is to serve the best interests of those who have provided the business with capital to finance its assets and activities, and who bear the risk that stems from an uncertain future. The essential task is to secure through rational investment, financing, and profit distribution decisions returns sufficient in both amount and timing to reward providers of capital for their initial and continuing support. Strictly speaking, this should apply to all suppliers of finance. However, those who provide equity finance are usually accorded preferential concern on the not unreasonable grounds that their risk is greatest, since their stake is strictly residual, and also that they are legal owners of the business. Hence, it is argued that the rational goal of financial management should be to maximise the value of an enterprise to its owners, which is believed to be a function of the amount, timing and risk of the cash-flows they ultimately receive.

The question to be addressed now is whether this strictly rational model of financial management is likely to be adhered to by quasi-rational SME owner-managers. The emphasis will be on the likely impact of the decision-making heuristics and cognitive biases described in the previous section of the paper.

According to McMahon and Stanger (1995), the financial objective function of an owner-managed SME is a complex function of:

- **P**, the pecuniary returns from the business including a return on invested capital; a reasonable salary for owner-manager expertise, experience, time and effort; any excess in owner-manager salary above a reasonable reward; and also the value of perquisites consumed.

- **N_s**, the non-pecuniary benefits from the business that are nevertheless in the financial domain such as security derived from an adequate liquidity buffer; security derived from having a diversified wealth holding; owning an investment that is easily transferable to others; having flexibility to change circumstances should this become necessary; sole retention of control; and avoidance of accountability to others.
• \( N_n \), the non-pecuniary satisfactions from the business that, strictly speaking, are outside the financial domain such as having a preferred lifestyle; being secure in self-employment; being able to offer secure employment to family and friends; maintaining good or benevolent relations with employees; having self-esteem or esteem of others; contributing to the wider community; and being philanthropic.

• \( R \), the total risk associated with owner-manager investment of financial and human capital in the business which is the sum of the systematic risk faced and the unsystematic or enterprise-specific risk faced.

This objective function is immeasurably more complicated than that proposed for larger business concerns by MFT, which would only include \( P \) and that part of \( R \) which is systematic risk. Furthermore, whereas MFT proposes maximising behaviour, the SME financial objective function contemplates the possibility of non-maximisation of financial returns. For example, owner-managers seeking lifestyle rewards may trade off lower \( P \) for greater emphasis on \( N_n \). Alternately, owner-managers wishing to cap the growth of their businesses may trade off lower \( P \) for greater emphasis on \( N_f \).

The SME financial objective function becomes even more complex when viewed from a BF perspective which introduces the possibility that the risk-return relationship at the heart of normative financial management is distorted by the influence of decision-making heuristics and cognitive biases. For example, owner-manager perceptions of both business risk and financial risk may be diminished by sample size neglect, overconfidence, excessive optimism and illusion of control, not to mention ignorance of all possible decision outcomes. Lowered risk perceptions may lead to a lowering of expected return; whereas overconfidence and excessive optimism may directly cause expected return to be unrealistically high. Whichever is the case, the facility of owner-managers to appraise risks faced and determine appropriate returns will be undermined with detriment to the quality of financial decision-making.

While financial management may involve a certain amount of retrospection (for example, through obtaining regular historical financial statements), the primary focus should be upon shaping a business’s financial future (for example, through business plans and/or budgets). However, the counterfactual thinking heuristic might cause an SME owner-manager to dwell excessively on the past, reflecting on what could have been if specific decisions or actions had been different. As indicated earlier, this can result in intense feelings of disappointment and regret which colour the owner-manager’s perceptions of past achievements and future opportunities, and which are likely to impact upon his or her future decisions and behaviour. On the other hand, counterfactual thinking can lead to experiential learning by improving understanding of likely causes of
particular events or outcomes. Thus, depending on the relative balance of costs and benefits, the ability of an owner-manager to be future oriented in financial management may be undermined or enhanced by counterfactual thinking. The representativeness heuristic suggests that, when an owner-manager is backward looking, he or she is likely to focus upon just the recent past. Hence, the base rate neglect and sample size neglect biases will ensure that the owner-manager does not have a realistic and accurate long-run picture of the business’s development. The planning fallacy cognitive bias is likely to result in inferior financial planning as the owner-manager systematically under- or over-estimates key financial variables that underpin business plans or budgets.

A particularly difficult problem for SME owner-managers is likely to be making a financial management decision requiring the abandonment of a course of action previously chosen which has ultimately proved to be financially detrimental to the business. Here, the framing heuristic and biases such as escalation of commitment, sunk cost fallacy and endowment effect may come into play. First, to the extent that the abandonment of an activity might lead to an immediate (but not sustained) loss, the framing effect and loss aversion could lead to deferral or rejection altogether of the decision that should be made. Second, to the extent that the present decision-maker is visibly associated with the original decision to undertake the activity to be abandoned, escalation of commitment may lead to entrenchment which becomes more pronounced the more negative the financial feedback becomes. Third, the sunk cost fallacy can cause the decision-maker to consider past outlays when reaching a decision. Unless abandonment promises, in some sense, to recover the past outlays, the correct decision based on future incremental benefits and cost may not be made. Finally, the endowment effect could cause the present activity to be wrongly more highly valued than other opportunities that may be available.

Comprehensive reviews of empirical evidence on the financial management practices employed by SME owner-managers world-wide are provided by McMahon et al. (1993) and Holmes et al. (2003). Empirical studies invariably find that the financial management practices used fall well short of what is recommended in relevant texts. In fact, it is not unusual to discover that financial management as conceived by MFT is widely neglected by owner-managers without the necessary expertise gained through experience, training or professional advice. Such circumstances are criticised by researchers who usually propose appropriate interventions to raise the standards of financial management. However, if financial management practices are viewed with a BF perspective, a case can be made that they may not, in fact, accord with the cognitive style of the typical SME owner-manager. For example, an overconfident owner-manager exhibiting an illusion of control might not see the need for financial planning and control techniques such as regular financial reporting, cost-volume-profit
analysis, budgeting and formal capital project evaluation. Rational decision-making usually facilitated by such techniques may be replaced by heuristic judgements based on limited data and some prior experience.

In closing, it should be pointed out that the BF literature suggests the detrimental consequences of quasi-rationality may ultimately be ameliorated by learning from experience. However, in SMEs with limited resources this can be a wasteful, costly and ineffectual process. First, if a major decision on, say, capital investment or external fund raising is made badly, the business may not have the resources necessary to survive the consequences and to rectify the error. Second, major decisions of this type are made infrequently and thus the opportunity to learn from experience is restricted.

**Conclusions and Recommendations**

The Behavioural Finance and Entrepreneurial Cognition research reviewed in this paper makes a plausible case that SME owner-managers are likely to employ heuristics and exhibit systematic cognitive biases in the financial management of their businesses. However, very little of the research reviewed specifically examines SME decision-making and practices in the financial domain. This clearly represents an opportunity for further research in this important area. Such research will need to undergo a paradigm shift from an essentially normative and confirmatory orientation of prior research towards a more open positive (that is, descriptive) and exploratory style. Instead of beginning with the principles and practices dictated by Modern Finance Theory and setting out to discover whether these are adhered to and undertaken, the research should instead seek to explore what heuristics and cognitive biases appear to impact financial decision-making and behaviour in SMEs and to use this knowledge to develop a positive theory of financial management in SMEs – a not inconsiderable challenge.

The research proposed will also be challenging in other respects. First, it will necessarily straddle the boundary between two academic disciplines – finance and cognitive psychology. It is most likely that experts in each discipline will need to collaborate in conducting the research. Second, it is highly unlikely that the quantitative and survey based methods typically employed in prior research on SME financial management will be suitable for discovering more about heuristics and cognitive biases. Rather, qualitative and possibly experimental methods will need to be used in order to gain the depth of understanding necessary to develop a positive theory. A significant problem is that SME owner-managers may not be conscious of the heuristics and cognitive biases upon which they rely, making them very difficult to observe using more superficial research methods. Relatively costly in-depth case studies and/or protocols of actual decision-making behaviours are therefore likely to be required. Finally, given the time pressures under which they very often operate, and also in
view of their typical secretiveness, it is likely that many SME owner-managers would neither have the time nor
the inclination to have their decision-making behaviour scrutinised in any depth. Obtaining a sufficiently large
and representative sample to permit generalisations to be made is therefore going to be a substantial obstacle to
theory building.

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might have been”’, Journal of Business Venturing, vol. 15, no. 1, pp. 79-91.
Baron, R.A., 2004a, ‘Potential benefits of the cognitive perspective: expanding entrepreneurship’s array of
Baron, R.A., 2004b, ‘The cognitive perspective: a valuable tool for answering entrepreneurship’s basic “why”
Baron, R.A. and Ward, T.B., 2004, ‘Expanding entrepreneurial cognition’s toolbox: potential contributions from
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<table>
<thead>
<tr>
<th>Work</th>
<th>Heuristics/Cognitive Biases Mainly Considered</th>
<th>Method</th>
<th>Key Findings</th>
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<tbody>
<tr>
<td>Mowen and Mowen (1986)</td>
<td>Framing.</td>
<td>Empirical study using survey instrument.</td>
<td>Small business managers were found to display decision biases arising from framing.</td>
</tr>
<tr>
<td>Cooper et al. (1988)</td>
<td>Excessive optimism.</td>
<td>Empirical study using survey instrument.</td>
<td>Entrepreneurs studied exhibit excessive optimism regarding success of their own businesses, but less optimism for similar businesses run by others. Those who are poorly prepared are just as optimistic as those who are well prepared. Optimism is conjectured to result (inter alia) from escalation of commitment and illusion of control.</td>
</tr>
<tr>
<td>Manimala (1992)</td>
<td>Over 180 highly specific heuristics.</td>
<td>Empirical study using published and unpublished case studies.</td>
<td>Heuristics employed by innovative and less innovative ventures vary significantly, and certain heuristics (over 70) are found to facilitate innovation.</td>
</tr>
<tr>
<td>Woo et al. (1992)</td>
<td>Excessive optimism.</td>
<td>Empirical study using survey instrument.</td>
<td>Entrepreneurs who exhibit more optimism concerning their new ventures undertake less extensive information searches to support venture establishment. Excessive optimism leads to overconfidence.</td>
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<tr>
<td>McCarthy et al. (1993)</td>
<td>Escalation of commitment.</td>
<td>Empirical study using survey instrument.</td>
<td>Entrepreneurs who had started their own businesses and who had expressed substantial overconfidence are significantly more likely to exhibit escalation of commitment. Escalation of commitment is more likely when feedback from the marketplace is negative.</td>
</tr>
<tr>
<td>Palich and Bagby (1995)</td>
<td>Framing, excessive optimism.</td>
<td>Empirical study using survey instrument.</td>
<td>When confronted with equivocal or ambiguous information about a new venture, entrepreneurs are more likely to frame the decision scenario positively (emphasising strengths and opportunities); whereas non-entrepreneurs emphasise negatives (weaknesses and threats). Thus, entrepreneurs tend to be more optimistic.</td>
</tr>
<tr>
<td>De Meza and Southey (1996)</td>
<td>Excessive optimism.</td>
<td>Reasoned argument, mathematical modelling.</td>
<td>Amongst a number of findings is a proposition that those who are excessively optimistic dominate new entrants to small businesses. That is, only optimists become entrepreneurs.</td>
</tr>
<tr>
<td>Busenitz and Barney (1997)</td>
<td>Overconfidence, representativeness.</td>
<td>Empirical study using survey instrument.</td>
<td>Entrepreneurs are significantly more likely to exhibit overconfidence and employ representativeness than are managers in larger businesses.</td>
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<td>Baron (1998)</td>
<td>Counterfactual thinking, aversion to regret, affect infusion, self-serving bias, planning fallacy, self-justification.</td>
<td>Reasoned argument.</td>
<td>Entrepreneurs frequently face situations that tend to overload their information processing capacity and that are characterised by high levels of uncertainty, complexity, novelty, emotion, time pressure and fatigue. These circumstances can be expected to maximise the influence of heuristics and cognitive biases upon decision-making.</td>
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<tr>
<td>Baron (1999)</td>
<td>Counterfactual thinking.</td>
<td>Empirical study using survey instrument.</td>
<td>Entrepreneurs are significantly less likely to engage in counterfactual thinking than are potential entrepreneurs and non-entrepreneurs. Entrepreneurs express significantly less regret over past events than potential entrepreneurs, and found it easier to admit past mistakes both to themselves and to others.</td>
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<td>Busenitz (1999)</td>
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<td>Simon et al. (1999)</td>
<td>Overconfidence, illusion of control, sample size neglect.</td>
<td>Empirical study using survey instrument.</td>
<td>Respondents exhibiting illusion of control and sample size neglect are found to have lower risk perception and to be more likely to undertake a new venture.</td>
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Table 1 (cont.): Summary of Research on Entrepreneurial Cognition

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<tr>
<td>Arabsheibani et al. (2000)</td>
<td>Excessive optimism.</td>
<td>Empirical study using survey instrument.</td>
<td>Self-employed individuals are more liable to excessive optimism than the employed. Excessive optimism is less evident for better educated and more experienced entrepreneurs.</td>
</tr>
<tr>
<td>Shepherd and Zacharakis (2000)</td>
<td>Sunk cost fallacy, endowment effect.</td>
<td>Empirical study using survey instrument.</td>
<td>Respondents giving greater consideration to sunk costs, and exhibiting a greater endowment effect, were less likely to sell family businesses on succession and/or undertake more risky investments.</td>
</tr>
<tr>
<td>Alvarez and Busenitz (2001)</td>
<td>Heuristics in general.</td>
<td>Reasoned argument.</td>
<td>Distinguish entrepreneurial cognition employing heuristics from managerial cognition that is more factually based; and argue that entrepreneurial cognition can be a source of competitive advantage.</td>
</tr>
<tr>
<td>Ucbasaran et al. (2001)</td>
<td>Heuristics in general.</td>
<td>Reasoned argument.</td>
<td>Research focusing on entrepreneurial cognition is required to differentiate behaviour of different types of entrepreneurs and the organisational forms they select.</td>
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<td>Keh <em>et al.</em> (2002)</td>
<td>Overconfidence, sample size neglect, planning fallacy, illusion of control.</td>
<td>Empirical study using survey instrument.</td>
<td>Respondents exhibiting illusion of control and sample size neglect are found to have lower risk perception and to be more likely to undertake a new venture.</td>
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<td>Markman <em>et al.</em> (2002)</td>
<td>Counterfactual thinking.</td>
<td>Empirical study using survey instrument.</td>
<td>Technological entrepreneurs are found to experience more intense regrets regarding business opportunities, whereas technological non-entrepreneurs tended to experience stronger regrets regarding career and education decisions.</td>
</tr>
<tr>
<td>Mitchell <em>et al.</em> (2002)</td>
<td>Heuristics and cognitive biases in general.</td>
<td>Reasoned argument.</td>
<td>Argues for scholars to adopt a cognitive perspective to fill the theoretical and empirical void left by abandonment of the personality traits approach to distinguishing entrepreneurs from others. The historical emergence and future prospects of the entrepreneurial cognition approach are considered.</td>
</tr>
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<td>Simon and Houghton (2002)</td>
<td>Illusion of control, sample size neglect, reasoning by analogy.</td>
<td>Reasoned argument.</td>
<td>Argues that entrepreneurs in smaller, younger firms that are considered pioneering are more likely to exhibit illusion of control, sample size neglect, and reasoning by analogy. These biases are likely to cause them to underestimate competition, overestimate demand and overlook requisite assets.</td>
</tr>
<tr>
<td>Astebro et al. (2004)</td>
<td>Overconfidence, excessive optimism.</td>
<td>Empirical study using survey instrument.</td>
<td>Technological entrepreneurs are significantly more confident and optimistic than the general population. Above average optimists are around twice as likely to commercialise their inventions as below average optimists.</td>
</tr>
<tr>
<td>Baron (2004a)</td>
<td>Heuristics and cognitive biases in general.</td>
<td>Reasoned argument.</td>
<td>Argues for scholars to adopt a cognitive perspective in their research because of the intrinsic complexity and multi-factorial nature of entrepreneurship.</td>
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<tr>
<td>Baron (2004b)</td>
<td>Framing, confirmation bias, excessive optimism, affect infusion, planning fallacy, illusion of control, sample size neglect, counterfactual thinking, aversion to regret, sunk cost fallacy.</td>
<td>Reasoned argument.</td>
<td>Argues for scholars to adopt a cognitive perspective since a knowledge of heuristics and cognitive biases can be helpful in addressing such questions as why some individuals become entrepreneurs while others do not, and why some entrepreneurs are more successful than others.</td>
</tr>
<tr>
<td>Baron and Ward (2004)</td>
<td>Heuristics and cognitive biases in general.</td>
<td>Reasoned argument.</td>
<td>Research in entrepreneurial cognition has investigated a very broad range of issues and topics and has generally found that cognitive factors play an important role in key aspects of the entrepreneurial process.</td>
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<tr>
<td>Forbes (2005)</td>
<td>Overconfidence.</td>
<td>Empirical study using survey instrument.</td>
<td>Greater overconfidence is exhibited amongst younger entrepreneurs, and amongst entrepreneurs with greater firm decision comprehensiveness and without external equity participation. Founder-managers are more overconfident than employed managers.</td>
</tr>
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