EFFECTIVE HEURISTICS FOR NEW VENTURE FORMATION

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Recommended Citation

Kraaijenbrink, Jeroen (2010) "EFFECTIVE HEURISTICS FOR NEW VENTURE FORMATION," Frontiers of Entrepreneurship Research: Vol. 30: Iss. 6, Article 5.
Available at: http://digitalknowledge.babson.edu/fer/vol30/iss6/5
EFFECTIVE HEURISTICS FOR NEW VENTURE FORMATION

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ABSTRACT

Researchers have extensively studied how entrepreneurs use heuristics. We explore how the various heuristics that have been articulated may have a different effect on causal than on effectual entrepreneurship. Based on the distinctions between the two approaches, the paper outlines five pairs of heuristics that may affect the approach chosen and its effectiveness. We conclude that, paradoxically, people may have a proclivity towards the approach by which they are most likely to fail. This suggests that, to be successful, entrepreneurs would need to step beyond their natural preference for a particular approach or to develop ways to cope with their biases.

INTRODUCTION

Since the ‘cognitive turn’ in the field of entrepreneurship in the early 1990s (Manimala, 1992; Shaver & Scott, 1991) an increasing number of entrepreneurship studies focus on the biases and heuristics used by entrepreneurs. Inspired by the work of Nobel laureates Kahneman and Tversky (Kahneman, Slovic, & Tversky, 1982; Tversky & Kahneman, 1974) entrepreneurship scholars have studied heuristics and biases associated with, for example, representativeness, overconfidence, availability, illusion of control, and anchoring (e.g., Busenitz & Barney, 1997; Busenitz & Lau, 1996; Holcomb, Ireland, Holmes Jr, & Hitt, 2009; Keh, Foo, & Lim, 2002). Studies on heuristics and biases so far have mostly focused on a logic of prediction. In cognitive psychology the emphasis has been on how biases and heuristics lead to incorrect predictions and estimations of probability (Gilovich, Griffin, & Kahneman, 2002; Kahneman, Slovic, & Tversky, 1982). Similarly, in entrepreneurship research the emphasis has been on how entrepreneurs predict the future value and success chances of opportunities and new ventures (Mitchell et al., 2002; Simon, Houghton, & Aquino, 2000).

In the last decade an approach to entrepreneurship has emerged that focuses on control rather than prediction. With Sarasvathy (2001, 2008) as its main exponent, this approach is known as ‘effectuation.’ With an effectual approach entrepreneurs’ starting point is what they can do themselves in order to make their new venture work, rather than predict whether it is likely to succeed or not – an approach labeled ‘causation.’ While relatively much research has been done on the role of biases in a prediction-oriented causation approach, less is known about their role in a control-oriented effectuation approach. To address this gap in the literature, this conceptual paper explores the role of biases in both a causation and an effectuation approach.

We start our exploration in the next section by outlining our assumptions on the use of biases and heuristics by entrepreneurs. The paper continues by articulating five pairs of heuristics that are likely to have a different effect on causation than on effectuation approaches to entrepreneurship. In doing so, we focus on the five distinctions between the two approaches as they have been put forward in recent work on effectuation (Dew, Read, Sarasvathy, & Wiltbank, 2009; Sarasvathy, 2008). By considering the effect of biases on both approaches, we observe a paradox in the relationship between the entrepreneurial approach that people are likely to choose and the effectiveness of that. We find that, paradoxically, people may have a proclivity towards the approach by which they are most likely to make mistakes because of their sensitivity to particular
biases. This suggests that the approach that would most naturally fit to an entrepreneur is also the
approach by which he or she has the highest risk of failure. If true, this implies that in order to be
successful, entrepreneurs would need to find a way to either step beyond their natural preference
for a particular approach or to develop ways to cope with their biases.

The implications of this conceptual work are threefold. First, by demonstrating that biases are
not limited to a prediction-oriented entrepreneurship the paper creates awareness of the broad
impact biases may have on entrepreneurial judgment and decision-making. This can help
entrepreneurs in developing more awareness of the mistakes they may make when setting up their
new venture. Furthermore, by explicating the differences in biases between effectuation and
causation, the paper provides a means to guide choices by entrepreneurs. By showing that both
approaches involve different biases the paper shows some of the risks associated with the two
approaches, thereby supporting entrepreneurs in the choice between them. Finally, the paper
contributes to the broader discussion on the use of biases beyond a comparison between
entrepreneurs and non-entrepreneurs. By relating biases to two distinct approaches to
entrepreneurship, a comparison can be made between different types of entrepreneurs as well.

Assumptions

Before we articulate the biases and heuristics associated with causation and effectuation, we
shall first explicate the main underlying assumptions. Our first assumption is that entrepreneurs
have no choice but to rely on heuristics in their decision-making. While forming their new
ventures, entrepreneurs are confronted with considerable uncertainty (Knight, 1921). They
continuously face new challenges, operate in unknown environments and have only a short
window of opportunity in which decisions have to be made. At the same time, though, they need
to make fundamental decisions that will strongly affect the future development and success of the
new venture. Under such uncertain circumstances, decision making is a challenging task. Since
entrepreneurs need to act quickly and do not have the luxury of an organization that can gather
information, they cannot make analytical, well-rationalized decisions (Gustafsson, 2006). Rather,
they need to rely on quick synthetical decisions based on biases, intuitive judgments, and untested
assumptions (Busenitz & Barney, 1997; Spender, 1989). Hence, for this paper we assume
entrepreneurs will have to rely on heuristics and biases in their day-to-day decision-making.

Secondly, we assume that people differ in their susceptibility to particular biases and heuristics
and that these to a large extent have a dispositional character. Some of the factors influencing a
person’s susceptibility to biases uncovered in cognitive research are mental models (Torrens,
1999), computation skills (Stanovich & West, 2001), personality (Block & Funder, 1986), and
experience (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Similarly, within the entrepreneurship
literature it has been found that entrepreneurs differ from managers (Busenitz & Barney, 1997),
bankers (Burmeister & Schade, 2007), and other non-entrepreneurs (Gaglio & Katz, 2001) in their
susceptibility to particular biases. These findings imply that a person’s susceptibility to biases is a
rather stable personal characteristic and that individuals may differ substantially in their
susceptibility to biases.

Finally, we assume that the extent to which a particular bias is harmful depends on the
circumstances in which it is used. As Gigerenzer and colleagues have demonstrated (Gigerenzer,
2004; Gigerenzer & Todd, 1999), the quality of decisions based on biases and heuristics depends
on the context in which they are used – something they label ‘ecological rationality’. Based on
their findings, we assume that, dependent on the context, a bias can be harmful, irrelevant, or even
beneficial for the outcome of the entrepreneurial process. Two contextual variables are recognized
in this paper. The first is the entrepreneurial approach itself. As already hinted at above, we assume that some biases play a central role in an effectuation approach while others do so in a causal approach. This means that, dependent on the entrepreneurial approach adopted, biases may prove harmful, irrelevant, or beneficial. A second contextual variable, also recognized in the literature on effectuation, concerns the predictability of the market (Sarasvathy & Dew, 2005). Hence, we will assume that the (positive or negative) effect of biases is different in predictable markets than in unpredictable markets. Both contextual variables will be further discussed in the remainder of this paper.

**Biases in Effectuation and Causation**

The notion of a bias assumes that there is one future or one correct value that is unknown to the actor that tries to estimate it. The foundational idea underlying the effectuation approach is exactly the opposite: there is not one future or one correct value. Rather, there are multiple possible futures that depend on the action taken by the entrepreneurs. This means that the future cannot be predicted, but is created (Sarasvathy, 2001; Sarasvathy & Dew, 2005). At first sight, this foundational rejection of prediction seems to exclude any role for biases in effectuation: if there is no correct value, an estimate cannot be wrong. However, also an effectuation approach is guided by human expectations, intentions, and beliefs. It is the very nature of human action that we do not simply respond to stimuli, or continue or habits and routines, but rather are also future oriented (Ajzen, 1991; Emirbayer & Mische, 1998; Joas, 1997). This means that also in an effectuation approach expectations and beliefs play an important role. This implies an effectuation approach is also sensitive to biases. Our beliefs in what we can control, for example, may be mistaken. In this section we analyze the biases involved in predictive and non-predictive approaches to entrepreneurship. In doing so, we adopt the five dimensions distinguished in recent work on effectuation (Dew, Read, Sarasvathy, & Wiltbank, 2009; Sarasvathy, 2008). For each dimension we indicate how expectations and beliefs drive entrepreneurial action and which biases may be involved. The results are summarized in Figure 1.

**Non-Predictive as Opposed to Predictive Control**

The first dimension on which causation and effectuation approaches differ is the extent to which entrepreneurs rely on prediction. While causal entrepreneurs try to accurately predict the future, effectual entrepreneurs engage in non-predictive control by eschewing predictive information in favor of what they can actually control at any given point in time (Wiltbank, Dew, Read, & Sarasvathy, 2006). Given the varying role of prediction and control in the two approaches, we expect that different biases will affect the entrepreneurial process. With a causation approach, biases relate to the entrepreneur’s expectations about what will happen in the future. A key bias that has been found to affect the quality of predictions is that of representativeness. As research has shown, people tend not to take into account the probability of an event when they attempt to predict it (Kahneman, Slovic, & Tversky, 1982). Rather, in judging the likelihood of future events or opportunities people compare these to characteristics of what they consider to be successful opportunities (Holcomb, Ireland, Holmes Jr, & Hitt, 2009). As Shaver & Scott (1991) illustrate it: a person for whom Restaurant X is typical of successful establishments will make a lower guess about failure than will a person for whom Restaurant X resembles failures. Since the actual probabilities of events are not taken into consideration, this bias may lead to substantial mistakes in predicting the success of a new venture.

With an effectuation approach, it is not prediction but control that is the primary starting point for entrepreneurial action. This means that the representativeness bias is less of an issue: if
entrepreneurs focus on what they can control, there is no need for them to predict what will happen, and thus the chances of a representativeness bias misleading their behaviors are smaller. However, with an effectuation approach, entrepreneurs need to consider and judge what lies within their span of control to establish their basis for action. The relevant expectation involved here is the entrepreneur’s belief in what s/he can control and what not. The processes of estimating what can be controlled and what not is sensitive to what has been called the illusion of control – an overemphasis and overestimation of one’s skills to control (Keh, Foo, & Lim, 2002; Langer, 1975). Research has shown that entrepreneurs tend to be particularly susceptible to this type of bias (Simon, Houghton, & Aquino, 2000). Given that an effectuation approach is built upon the notion of control, this would mean that the illusion of control bias has a greater effect on effectuation than on causation.

Means-Driven as Opposed to Goal-Driven Action

The second dimension that distinguishes a causation from an effectuation approach concerns the starting point for taking action. A causation approach is goal-oriented. This means that goals are the starting point and determine the actions that should be taken and means that should be gathered. An effectuation approach, on the other hand, starts from means and considers what can actions these means allow and what goals can be achieved with them. With its goal-orientation, a causation approach is susceptible to what has been called the planning fallacy (Buehler, Griffin, & Ross, 1994; Keh, Foo, & Lim, 2002) – the tendency to overestimate what can be achieved in a particular time frame. It results from being overly optimistic about what can be achieved and forgetting about past failures. As a result, goals set by the entrepreneur may turn out to be unrealistic or even unattainable.

Driven by means rather than goals, an effectuation approach is less likely to be affected by this bias. Yet, as such it may be susceptible to biases associated with using the means that one has already at his or her disposal. A bias that may particularly affect the effectuation approach on this dimension is that of anchoring and adjustment. This bias concerns people’s tendency to start with an implicitly suggested reference point (the "anchor") and make adjustments to it to reach their estimate. The bias involved here is that people tend to adjust insufficiently, even if their reference point is knowingly random (Kahneman, Slovic, & Tversky, 1982). Applied to the effectuation approach, the expectation here concerns a belief in which means are valuable or useful and an estimation about what can be done with them. It has been shown that initial means, or initial investments serve as a frame of reference for entrepreneurs that may lead to an underestimation of future means that would be needed (Holcomb, Ireland, Holmes Jr, & Hitt, 2009; McGrath, 1999). As a result of this bias, once started in a particular direction, entrepreneurs are anchored and likely to adjust insufficiently. With respect to this, Kim & Mauborgne (1998) found that successful entrepreneurs let not constrain themselves by their existing assets and capabilities and are willing to break with these to the extent that they start anew.

Affordable Loss as Opposed to Expected Return

A third dimension recognized in the entrepreneurship literature concerns the entrepreneur’s attitude towards risk and returns. Entrepreneurs adopting a causal approach tend to focus on and calculate expected future returns, thereby choosing those ventures with the highest expected return. Effectual entrepreneurs, on the other hand, focus on how much they are willing to loose in a venture. Hence, their choices are not guided by uncertain returns in the future, but by setting limits to what they are willing to invest. Causal entrepreneurs let guide their decisions by estimations of expected return and are susceptible to being over-optimistic about what their
investment will bring. There is a growing body of evidence showing that entrepreneurs do not have a higher risk propensity or willing to take more risks than others (Baron, 2004; Janney & Dess, 2006; Palich & Bagby, 1995; Simon, Houghton, & Aquino, 2000). However, it has been found that entrepreneurs perceive different and generally lower risks than others (Forlani & Mullins, 2000). While their estimation may be correct sometimes, entrepreneurs also tend to be overly optimistic, overestimating their chances of success and underestimating their chances of failure (Baron, 2004; Cassar & Craig, 2009). This makes causal entrepreneurs susceptible to optimism bias, also known as wishful thinking, positive outcome bias and the valence effect: the tendency for people to overestimate the likelihood of good things happening rather than bad things (Armor & Taylor, 2002; Baron, 2004; Pessoa, McKenna, Gutierrez, & Ungerleider, 2002).

While causal entrepreneurs run the risk over over-investing in their venture because of optimism, effectual entrepreneurs are susceptible to under-investing because of a bias of loss aversion. As Kahneman and colleagues have discovered, people tend to value something that they have higher than something they would need to acquire (Kahneman, Knetsch, & Thaler, 1991; Tversky & Kahneman, 1991). In its extreme form, this bias leads to a zero risk bias or certainty effect, which reflect preferences to reduce a small risk to zero over a greater reduction in a larger risk (Gowda, 1999). For entrepreneurs this bias involves the risk of not investing sufficiently to get a new venture started, and thereby at the end wasting their money.

Partnerships as Opposed to Competitive Analysis

A fourth type of bias relevant in the entrepreneurial process relates to the entrepreneur’s attitude towards others. The traditional, causal, view of entrepreneurs is one of single persons or single companies competing with others. The causal entrepreneur engages in a competitive analysis and selects those market(s) where competition would be relatively easy. After making this choice, causal entrepreneurs look for potential partners and stakeholders that could help them to compete. Effectual entrepreneurs, on the other hand, build partnerships and bring stakeholders on board even before clarifying the markets they will serve and other goals for the venture. With a causal approach, the emphasis is first on shaping ideas and setting goals and only later on involving others in the new venture building process. Other parties are seen as partners that provide additional means enabling the entrepreneur to achieve his or her goals. With this approach, causal entrepreneurs are susceptible to a self-serving bias, and related biases such as the behavioral confirmation effect and egocentric bias by which people tend to claim more responsibility for successes than for failures and attribute successes more to themselves than to others or luck (Bradley, 1978; Kahneman, Slovic, & Tversky, 1982; Miller & Ross, 1975). In the innovation management literature this bias appears in the ‘not invented here syndrome’, by which people refuse to accept an idea simply because it is from someone else (Katz & Allen, 1982). An example in entrepreneurship is how entrepreneurs can be strongly attached to their own ideas and are hardly willing to accept advices from others.

Effectual entrepreneurs allow others on board to determine what goals to pursue, which in turn determines over time which markets the venture will end up in or create (Dew, Read, Sarasvathy, & Wiltbank, 2009). This makes them susceptible to the opposite bias as causal entrepreneurs. Rather than inappropriately preferring their own ideas over those by others, they run the risk of too easily accepting the ideas of others. Since effectual entrepreneurs let others to a large extent influence the goals and direction of the firm, they run the risk of relying too much on the judgment and opinion of others. This has been called the herd instinct of herd behavior – by which people will be doing what others are doing rather than using their information (Banerjee, 1992; Scharfstein & Stein, 1990). It has also been called the social proof bias, by which people look at
the actions of others to decide what is appropriate (Cialdini, 1985; Rao, Greve, & Davis, 2001). By this bias, people attribute a higher status to outsiders than to themselves and to those in their immediate network. Thereby, they rate the behaviors and opinions of outsiders as more important than those of others. Examples are how managers tend to value external knowledge or advice higher than those from within their organization (Menon & Pfeffer, 2003), and how entrepreneurs following an effectual approach run the risk of over-trusting others (Goel & Karri, 2006).

**Leveraging as Opposed to Avoiding Contingencies**

The final dimension that has been put forward to distinguish causal approaches to entrepreneurship from effectual ones concerns how entrepreneurs deal with contingencies. Causal entrepreneurs are working towards a specific goal and are trying to avoid unexpected surprises. Anything that has not been anticipated in advance is seen as a possible threat to achieving their goals and should thereby be avoided. Effectual entrepreneurs do the opposite. Rather than avoiding contingencies they attempt to use them to the best extent. They make do with what comes their way and attempt to transform both positive and negative contingencies into useful opportunities for their venture (Dew, Read, Sarasvathy, & Wiltbank, 2009). By their focused goal-orientation, causal entrepreneurs run the risk of focusing too narrowly and failing to exploit beneficial contingencies they may encounter. Also, they may be unwilling to adjust their direction based on new, negative information or events. As such, causal entrepreneurs are susceptible to *escalation of commitment*, or sunk cost fallacy by which people want to be consistent in the course of time and justify their previous decisions by committing to them in later decisions (Arkes & Blumer, 1985; Staw, 1976, 1981). Research has shown that entrepreneurs are prone to this bias and sometimes commit to a path taken with their venture despite of continuous underperformance (DeTienne, Shepherd, & De Castro, 2008) or expected future performance (McCarthy, Schoorman, & Cooper, 1993).

While causal entrepreneurs run the risk of becoming too committed to their original goals and decisions, effectual entrepreneurs run the opposite risk. By trying to leverage all contingencies they encounter, they may drift away and constantly change the direction of their firm. The type of bias that they are susceptible to in this case is the *availability bias*, by which people base their decisions on information that is available and ignoring information that is not available (Holcomb, Ireland, Holmes Jr, & Hitt, 2009; Kahneman, Slovic, & Tversky, 1982). Related biases expressing similar mechanisms are the exposure effect and salience bias (Palich & Bagby, 1995). Shaver & Scott give the following example to explain this bias: “A person who just read about another restaurant's closing in the morning paper will give a higher estimate of failures than will a person who has not seen such a story in a long time” (Shaver & Scott, 1991: 33). By this bias, entrepreneurs may give too much attention to what may just be random effects and to contingencies that would otherwise not even affect the firm.

**BIASES AND ENTREPRENEURIAL EFFECTIVENESS**

As our discussion of the five pairs of biases has indicated, each of them may lead to mistaken beliefs or expectation, or trigger inappropriate actions by the entrepreneur. In the remainder of this paper we will further explore the extent to which these biases are harmful for the entrepreneur, dependent on the context in which they are adopted. This will result in a set of propositions for future research.

**Propensity to Adopt an Entrepreneurial Approach**
If a person’s susceptibility for particular biases is a dispositional characteristic, this is likely to influence his or her choices and behavior. In the context of this paper, this means that the type of biases a person is susceptible to will influence his or her choice of entrepreneurial approach. More specifically, it can be expected that persons with a sensitivity for a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment prefer a causation approach over an effectuation approach. Persons susceptible to these biases tend to overestimate their own capacity to predict and can therefore be expected to favor an entrepreneurial approach based on prediction. Persons more susceptible to an illusion of control, anchoring bias, loss aversion, herd behavior, and availability bias, on the other hand, are likely to prefer an effectual approach to entrepreneurship. Such persons tend to attach too much value to the means they have and to the ideas and events that come to them and can therefore be expected to favor an effectual approach. They will like to focus on what they can control, anchor their business on what they already have, reduce risks, listen very much to others, and react to all kinds of contingencies. This leads to our first two propositions:

**Proposition 1a.** Entrepreneurs particularly susceptible to a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment will choose a causation approach more often than an effectuation approach.

**Proposition 1b.** Entrepreneurs particularly susceptible to an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias will choose an effectuation approach more often than a causation approach.

### Success of an Entrepreneurial Approach

Propositions 1a and 1b suggest that entrepreneurs choose the entrepreneurial approach that matches the kind of biases they are sensitive too. If we furthermore accept that an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias are likely to be harmful in an effectuation approach and that a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment are likely to be harmful in a causal approach, this leads to a paradox: entrepreneurs naturally tend to choose the approach in which their biases most likely will lead to mistakes. This means that entrepreneurs will prefer a particular approach and at the same time make mistakes by using that approach because of their susceptibility to particular biases.

The tendency to choose the approach by which you make most mistakes reflects a self-selection bias that occurs when an entrepreneurial approach would be intuitively chosen and more based on convenience rather than rationality. Self-selection biases occur widely in, for example, choosing education (Willis & Rosen, 1979), setting a sample for research (Heckman, 1979), or choosing one’s occupation (Polachek, 1981). While it oftentimes may be effective or neutral, our analysis suggests that in the case of choosing an entrepreneurial approach, self-selection may lead to undesired or suboptimal results – in a way similar to our tendency to choose for fast food out of convenience rather than because it is good for us (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998). This leads to our second proposition:

**Proposition 2.** Entrepreneurs tend to prefer the entrepreneurial approach by which they are most likely to make mistakes.

Would entrepreneurs be primitive followers of their own natural inclinations, this paradox implies that they would ultimately fail. However, numerous entrepreneurs have succeeded in
building successful businesses using either a causal or an effectual approach. If the above propositions hold, this means that these entrepreneurs must have found a way to deal with their biases and that their behavior is neither fully determined by their natural propensity, nor is it a stimulus-response reaction to the context they are in. This means entrepreneurs in practice use their human agency to step beyond the forces of their own inclinations and those of their environment. With agency we refer here to the sociological concept – not the one in principal-agent theory (Eisenhardt, 1989; Ross, 1973) since the latter provides a too restricted view on agency – especially of the agent (see Perrow, 1986 for a critique). Human agency is a complex idea with its own vast literature (Emirbayer & Mische, 1998). But it expresses that the human situation is under-determined and we manifest our identity and flourish by making choices about our actions that change our situation. It gives the entrepreneur room for discretion and choice (Finkelstein & Boyd, 1998; Hambrick & Finkelstein, 1987). Applied to the realm of this paper, it implies that entrepreneurs are affected by their dispositions and positions, but that they still have the ability to choose an entrepreneurial approach.

With respect to the way entrepreneurs make such choice, it is useful to consider the difference between experienced and novice entrepreneurs. Research on causation and effectuation has shown that experienced entrepreneurs more often use an effectuation approach while novices tend to use a causation approach (Dew, Read, Sarasvathy, & Wiltbank, 2009). We suspect this is not because of a different natural inclination but more the result of the learning that experienced entrepreneurs have gone through. In one way or the other, experienced entrepreneurs have learned to effectively use an effectuation approach. This could mean a) they have a tendency for causal biases, but have learned to resist a causal approach, or b) they have developed coping mechanisms to deal with their effectual biases. We will expand further on both ways below.

The first way in which entrepreneurs can use their agency to successfully deal with their biases is by choosing an entrepreneurial approach in which the (negative) effect of their own biases is minimized. This would mean that entrepreneurs with a strong inclination towards an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias deliberately choose to follow a causation approach or that entrepreneurs with an inclination towards a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment deliberately choose an effectuation approach. With respect to the success of entrepreneurs this would mean that entrepreneurs that are particularly sensitive to biases associated with effectuation will be more successful if they choose for a causation approach. Similarly, entrepreneurs sensitive to the biases associated with causation would be more successful choosing an effectual approach. This is expressed in propositions 3a and 3b.

**Proposition 3a.** Entrepreneurs particularly sensitive to an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias will be more successful following a causation approach than entrepreneurs particularly sensitive to a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment.

**Proposition 3b.** Entrepreneurs particularly sensitive to a representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment will be more successful following an effectuation approach than entrepreneurs sensitive to an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias.

Following an approach against ones own inclinations may be difficult for some persons. Moreover, given that market conditions play a role as well, it may not always be appropriate to do...
so. If the market is unpredictable, a causal approach is likely to fail, independent of the biases, since there is not much to predict in such market. This would mean that entrepreneurs should best adopt an effectuation approach, irrespective of their own biases and natural preferences. In order to avoid the mistakes that may result from their biases, entrepreneurs may develop coping mechanisms that reduce the biases or the negative effects thereof. Given that biases are deeply rooted in human cognition and we are usually not aware of them (Kahneman, Slovic, & Tversky, 1982), developing such coping mechanisms is likely needs time and experience. We suspect this is an important reason why experienced entrepreneurs are able to effectively apply an effectuation approach (Dew, Read, Sarasvathy, & Wiltbank, 2009). In the case of experienced entrepreneurs using an effectuation approach, this would mean they have developed mechanisms to cope with the relevant biases. This means they should have learned to avoid or reduce their susceptibility to an illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias and are thereby able to successfully use an effectuation approach. Implicit in the claim that experienced entrepreneurs use an effectuation approach is that they do this successfully. This though, does not necessarily mean that a causation approach cannot be successful. If the market conditions are appropriate – e.g., when there is some predictability – a causation approach can be successful if entrepreneurs are able to cope with their causal biases. This suggests that a causation approach can be successful if entrepreneurs are able to avoid or reduce their representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment. This leads to our final two propositions:

**Proposition 4a.** Entrepreneurs that successfully follow an effectuation approach have developed mechanisms to cope with their illusion of control, anchoring bias, loss aversion, herd behavior, and/or availability bias.

**Proposition 4b.** Entrepreneurs that successfully follow a causation approach have developed mechanisms to cope with their representativeness bias, planning fallacy, optimism bias, self-serving bias, and/or escalation of commitment.

**DISCUSSION AND CONCLUSION**

The aim of this paper was to explore the role of biases and heuristics in both predictive and non-predictive modes of entrepreneurship. In doing so, the paper provides a typology of entrepreneurial heuristics that is directly connected to the causation-effectuation model and a set of propositions on their effectiveness. As such, the paper contributes in three ways to the entrepreneurship literature.

First, by arguing that the use of heuristics is not limited to prediction-oriented entrepreneurship the paper creates awareness of the broad impact heuristics may have on entrepreneurial decision-making. So far, most research on biases and heuristics has focused, either implicitly, or explicitly, on a predictive, causal mode of entrepreneurship. In this paper we have outlined that biases play an important role in a non-predictive effectual mode of entrepreneurship as well. The implication of this is that we may want to revisit the literature on entrepreneurial heuristics and investigate whether the theories and empirical findings would apply in an effectuation approach as well.

Furthermore, by explicating the differences in heuristics between effectuation and causation, the paper provides a means to guide choices by entrepreneurs. Adopting an agentic perspective on entrepreneurs, we have argued that entrepreneurs have at least two options to deal with their particular biases: in the choice of approach and in the development of coping mechanisms. By showing the various biases associated with the approaches, the paper shows some of the risks
involved, thereby supporting entrepreneurs in the choice between them. This also enables a better understanding of the conditions under which effectuation and causation approaches can be successfully used in practice. Where the extant literature has focused on market conditions and entrepreneurial experience, the current paper has contributed to this discussion by connecting these to the biases and heuristics used by entrepreneurs. The most straightforward way to think of coping mechanisms is perhaps to argue that effective entrepreneurs have learned to get beyond their biases and act rationally. However, also experienced entrepreneurs face a lack of time and information which makes that rational decisions often cannot be made. An alternative would be that effective entrepreneurs have learned to correct their own biases with additional heuristics. Examples would be that to cope with their herd behavior they have taught themselves that they should always double-check what others are saying, or that in order to cope with their planning fallacy they always remind themselves that only a part of what they have planned is usually achieved. To better understand the nature of coping mechanisms and the extent to which they are used, a deeper analysis of the coping mechanisms would be needed in future research.

Finally, the paper contributes to the broader discussion on the use of heuristics by going beyond a comparison of entrepreneurs and non-entrepreneurs. Existing trait-based entrepreneurship literature has focused on the distinction between entrepreneurs and non-entrepreneurs, and has taken a rather deterministic approach – not allowing the entrepreneur to use his or her agency and not looking at the entrepreneurial process. By relating heuristics to the two entrepreneurial approaches, the paper facilitates a more in-depth analysis of types of entrepreneurship as well. Within the current paper, we have aggregated the dimensions into effectuation and causation approaches and have aggregated the biases into ‘effectuation-type biases’ and ‘causation-type biases’. Given that the dimensions as well as the biases need not necessarily go together in practice, future research should be conducted on a more detailed level of granularity and further analyze the relationship between particular biases and particular dimensions of the effectuation-causation distinction. In this paper we have taken a helicopter-view on the biases in order to embrace all five distinctions between the two entrepreneurial approaches. As a result our discussions of the individual biases has not reached the depth they deserve. Given the broad scope and extensive literature on each of the ten articulated biases, it would be advisable in future research to select one or few biases at a time and scrutinize their effect on the two entrepreneurial approaches in detail.

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ACKNOWLEDGEMENTS

This research is co-funded by the European Fund for Regional Development. Furthermore, I would like to thank Saras Sarasvathy for her insightful comments on an earlier version of this paper.

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Figure 1: Biases Associated with Causation and Effectuation

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<th>Effectuation biases</th>
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<tbody>
<tr>
<td>Illusion of control</td>
<td>Representativeness bias</td>
</tr>
<tr>
<td>Anchoring bias</td>
<td>Planning fallacy</td>
</tr>
<tr>
<td>Loss aversion</td>
<td>Optimism bias</td>
</tr>
<tr>
<td>Herd behavior</td>
<td>Self-serving bias</td>
</tr>
<tr>
<td>Availability bias</td>
<td>Escalation of commitment</td>
</tr>
</tbody>
</table>

Non-predictive vs. predictive control
Means-driven vs. goal-driven action
Affordable loss vs. expected return
Partnerships vs. competitive analysis
Leveraging vs. avoiding contingencies