BIASES AND HEURISTICS IN STRATEGIC DECISION MAKING: DIFFERENCES BETWEEN ENTREPRENEURS AND MANAGERS IN LARGE ORGANIZATIONS

Lowell W. Busenitz, University of Houston, CBA - Management Dept., Houston, TX 77204-6283
Jay B. Barney, Texas A & M University

ABSTRACT

The research question "How are entrepreneurs different from managers in large organizations?" was addressed. This study hypothesized that entrepreneurs utilize biases and heuristics in strategic decision making more extensively than managers in large organizations. The results suggest a new and potentially more useful way of thinking about the entrepreneurial difference.

INTRODUCTION

Casual observations suggests that individuals who start their own organizations are somehow "different" from individuals that work in large organizations. Entrepreneurs have been described as risk takers and rugged individualists, as engaging in deviate social behavior, and as being a "breed apart" (e.g., Begley & Boyd, 1987; Ginsberg & Buchholtz, 1989). In contrast, managers in large organizations have been described as being risk averse adhering to broadly accepted norms of behavior (Pettigrew, 1973), and more professional and predictable in their decision making (Barnard, 1968). Implicit in much of this discussion is the assumption that entrepreneurs, or would-be entrepreneurs, need to have the right composition.

These casual observations have not gone untested in the research literature. Unfortunately, most efforts to empirically describe individual differences between entrepreneurs and managers in large organizations have met with limited success (Low & MacMillan, 1988). These results have led many researchers to abandon the search for individual differences between entrepreneurs and managers in large organizations, and look for explanations of entrepreneurial behavior. However, much phenomena surrounding the establishment of new firms remains unexplained. Reasons for the high failure rate of new start-ups remains largely unexplained. The use of various business and economic principles that help explain the maneuvers of large firms are often of little help in understanding the successes and failures of new ventures.

The purpose of this paper is to refocus attention on individual differences explanations of entrepreneurial behavior. However, rather than focusing on the individual differences previously studied, this paper examines differences in the decision making processes used by entrepreneurs and managers in large organizations. Building on non-rational decision making models from behavioral decision theory (Stevenson, Busemeyer, & Naylor, 1990), we argue that entrepreneurs are more subject to decision making biases than managers in large organizations. Two decision making biases and heuristics are examined: overconfidence and representativeness (Fischhoff, Slovic, & Lichtenstein, 1977; Hogarth, 1987; Tversky & Kahneman, 1974). By examining these cognitive bias individual differences, this paper reaffirms the casual observation that entrepreneurs really are different from managers in large organizations in some important ways.

THEORY

The failure of research on individual differences between entrepreneurs and managers in organizations presents a challenge to researchers. On the one hand, more rigorous research using traditional psychological and personal/demographic differences does not seem to generate more powerful results. On the other hand, efforts to focus on external factors do not completely abandon individual differences models. Thus, to continue necessary research on individual differences between entrepreneurs and managers in large organizations, the task is not simply to study traditional differences better, but to study new individual differences.

The major thesis of this paper is that the uses of biases and heuristics in decision making are critical in understanding differences between entrepreneurs and managers in large organizations. In this context, biases are subjective and/or predisposed opinions that influence the decision process. Heuristics are also subjective in nature, but are specific "informal rules-of-thumb" or intuitive guidelines that yield quick and usually acceptable decisions to problems (Tversky & Kahneman, 1974; Nisbett & Ross, 1980). The term "biases and heuristics" will be used here to refer to these general decision making phenomena.

In spite of the obvious importance of strategic decision making in emerging ventures (Hambrick & Crozier, 1985), only a few studies have specifically examined decision making among entrepreneurs (Gilmore & Kazanjian, 1989; Smith, Gannon, Grimm, & Mitchell, 1988). Moreover, virtually none of this research uses biases and heuristics in the study of strategic decision making among entrepreneurs. This is the case even though it is widely recognized that both the complexity of decisions facing entrepreneurs (e.g., Smith et al., 1988) and the speed with which entrepreneurs must make decisions (Eisenhardt, 1989) are the conditions under which biases and heuristics are most likely to operate (Stevenson et al., 1990; Nisbett & Ross, 1980). The one exception to this lack of inquiry into the use of cognitive biases and heuristics in entrepreneurial decision making is the work by Manimala (1992), who found 77 heuristics to be used more by entrepreneurs in highly innovative ventures.

Hypotheses

The decision was made to exam the representativeness heuristic and the overconfidence bias because they are two of the most widely discussed biases and heuristics (e.g., Hogarth, 1987; Kahneman et al., 1982; Tversky & Kahneman, 1974) and these two were compatible with the research design used for

this study. In this study, entrepreneurs are those who are organizational founders who are currently involved in the founding process. As already noted, managers are individuals with middle to upper level responsibilities with substantial oversight in large organizations.

While much of the research on biases and heuristics tends to link the nature of the task with the use of specific heuristics, one emerging generalization is that overconfidence in judgments is widespread (Fischhoff et al., 1977). Decision makers tend to be overly optimistic in their estimation abilities upon receiving initial information (Fischhoff et al., 1977), particularly when they are relatively unfamiliar with the problem and/or substantial uncertainty exists (Lichtenstein & Fischhoff, 1977). Furthermore, decision makers tend to be overconfident in their initial assessments and slow to revise their initial judgments appropriately as additional information becomes available.

Consistent with the frequent observations that entrepreneurs tend to be overly enthusiastic regarding the potential of their venture's success, Cooper, Dunkelberg, and Woo (1988) found that entrepreneurs assigned a higher probability of success to their own ventures while prescribing noticeably lower odds of success to other ventures like theirs'. As new information becomes available suggesting a revision in the original decision or that the success of the new venture is highly unlikely, necessary adjustments are likely to be ignored or minimized. While Bazerman (1986) and others have made suggestions as to how to avoid the pitfalls of overconfidence, this may be difficult for entrepreneurs. Many of the solutions to their problems are simply unknown in advance, and little information is generally available that would contradict their optimism. Perhaps more importantly, if entrepreneurs had a lower level of confidence in their decision making ability, most new ventures would never get launched. Their overconfidence keeps them from being overwhelmed with the multiple hurdles they face. On the other hand, managers in large organizations generally deal with more established markets, more information, and relatively established organizational routines. These observations lead to the following hypothesis:

Hypothesis 1: Entrepreneurs will manifest a stronger overconfidence bias than managers in large organizations.

Inferences in decision making are made by using current information to derive further propositions regarding a problem. This inference process frequently relies on the concept of "representativeness," a heuristic Tversky & Kahneman (1974) defined as a relation between a hypothetical process and some event associated with the process. This heuristic suggests that decision makers tend to oversimplify alternative outcomes by associating them with current knowledge and personal rules that have emerged from prior experiences. People predict outcomes on the bases of salient features of events, and they ignore other important characteristics of the evidence, including the validity and reliability of the data as well as the actual probabilities of events occurring (Bar-Hillel, 1979). While previous research has identified various dimensions of representativeness, this study focuses on insensitivity to sample size. The law of large numbers (or insensitivity to sample size) assures that a large sample will be representative of a given population. However, Kahneman et al. (1982) noted that decision makers tend to overestimate the representativeness of small samples, feeling as if small samples may be very representative of an entire population.

Decision making in the entrepreneurship area may actually be enhanced by using biases and heuristics because small and non-representative samples are generally all that exist. In bringing an untested product to market, reliable market research is generally very limited, since products so often deal with previously nonexistent markets. Thus, an entrepreneur is likely to get some limited feedback from biased samples such as a few potential customers, friends, and/or a colleague or two. On the basis of these biased samples and specific rules-of-thumb, entrepreneurs think they have an adequate "feel" for the market and move forward. On the other hand, managers in large organizations are more likely to be more rational in their decision making for several reasons. First, cause-effect relationships can be better established because they deal with a large number of similar situations. Second, they have access to more and better information, and use of this information is enhanced by their linkages with numerous colleagues. Finally, they are more familiar with comprehensive decision making patterns due to their training and the emergence of more rational decision making within their organizations. This leads to the following hypothesis:

Hypothesis 2: Entrepreneurs will manifest representative heuristics more extensively than managers in large organizations.

METHODS

Samples

As implied by these hypotheses, samples from two populations were drawn: a sample of entrepreneurs and a sample of managers in large organizations. The entrepreneurs were organizational founders who are currently involved in the start-up process. The industries included the manufacturing of plastics and electronics. A priori, it was thought that these categories would represent a higher percentage of newly emerging firms because they represent more dynamic industries. From a sample of 573 firms, most of which were in the plastics or electronic manufacturing industries, 176 responses were received for a 31% response rate with a usable response rate of 22%. To test for a biased response based on industry classification, non-respondents were compared to respondents based on the two-digit SIC categories identified above. The results from the chi-square test suggested that the usable response was not biased (X^2 (5) = 1.782; p = .878).

In this study, managers in large organizations were defined as individuals who have responsibility for at least two functional areas (such as marketing, finance, personnel, R&D, and manufacturing) and work for a publicly owned organization with more than 10,000 employees. These managers are often referred to as divisional managers or general managers because they oversee multiple areas (sample average was 4.55 functional areas). A usable response rate of 54% was received.

The SIC for the managers included in this sample came from the 1300, 3400, 3500, 3600, and 3800. The results of the chi-square test between useable responses and non-respondents again suggest that the response was not biased (X^2 (4) = 3.973; p = .59).

Measures

Overconfidence. To measure overconfidence, we replicated the widely cited studies conducted by Fischhoff et al. (1977) and Lichtenstein and Fischhoff (1977). The resulting data facilitated the computation of a statistical score for each observation and calibration curves for our entrepreneurs and managers. This curve reveals how closely the designated probability score for each category (.50, .60, etc.) and for each group (in this case entrepreneurs versus managers in large organizations) approximates the perfectly calibrated curve.

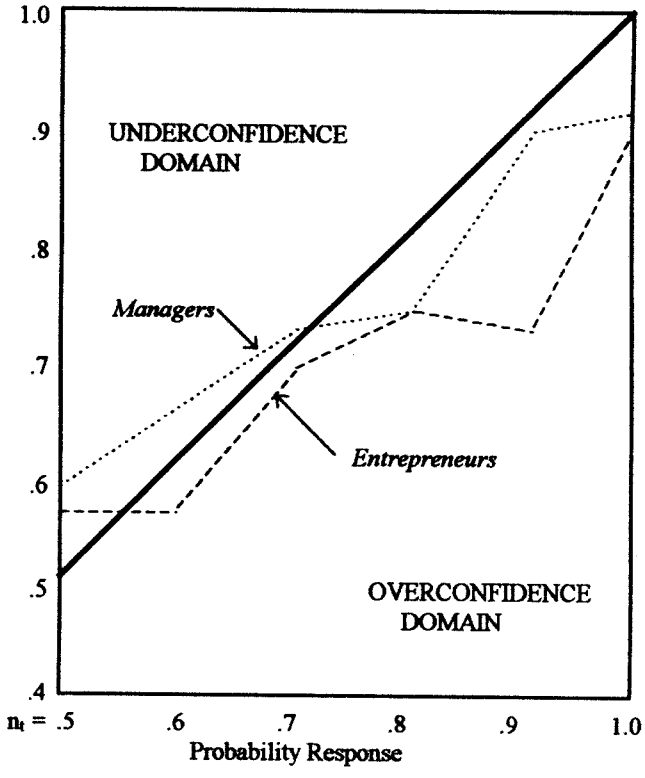
Representativeness. Following the lead of Fong, Krantz, and Nisbett (1986) and Fong and Nisbett (1991) decision scenarios representing various types of real-to-life strategic decisions was used. Both problems used for this study portrayed a strategic decision pitting two alternatives against one another. One alternative was based on quantitative/statistical information while the other was based on heuristic reasoning. Subjects were told to decide between the two alternatives for each problem and then to describe their reasoning for reaching the designated decision. Following the coding schema developed by Fong and colleagues, coders then analyzed these responses to determine whether heuristic type reasoning was used by the respondents. There was exact agreement between coders 84% of the time. These results were then summed across the two problems to create a single 3-category variable (0-2). A "2" indicated that an individual used statistical reasoning across both problems while a "0" indicated that only heuristic reasoning was used.

Control variables. While research on differences between entrepreneurs and managers in large organizations has generated mixed results, we chose to include several of these variables: risk-taking, need for conformity, age, education, networking intensity, and economic factors.

RESULTS

First, bivariate analysis was conducted with the overconfidence variable. The calibration curve shown in Figure 1 represents the aggregated results of the number of correct responses in each category (50%, 60%, ... 100%) divided by the total number of responses in each category. For example, if all the responses in the .70% category given by managers were correct 7 out of 10 times, then one would conclude that as a group they tend to be perfectly calibrated (at least in that category). The charting of these two curves in Figure 1 indicates that entrepreneurs are overconfident in their choices in five out of the six probability categories while managers were overconfident only three out of the six categories. Additionally, entrepreneurs were more overconfident than managers in large organizations in each of the categories except in the .8 range probability where they were very nearly identical.

FIGURE 1
Calibration Curves for Entrepreneurs and Managers



Since the dependent variable in this model was dichotomous, logistic regression was employed as the primary test of Hypotheses 1 and 2 (coded "1" for entrepreneurs and "2" managers). Given this coding, Hypothesis 1 suggests that the coefficient of the overconfidence variable will be positive and significant, while Hypothesis 2 suggests that the representativeness coefficient will be negative and significant. As shown in Table 1, both variables are significant and in the expected direction. Of the control variables, education, conformity, and alertness remain statistically significant. The risk-taking, age, and networking variables were non-significant. Overall, these results support the emerging consensus that psychological, personal/demographic, and broader social and economic factors have a limited ability to distinguish entrepreneurs from managers in large organizations. More importantly for this study, consistent support was found for Hypotheses 1 and 2. Even after controlling for previously examined factors, the overconfidence and representativeness measures remain statistically significant, and help distinguish between entrepreneurs and managers in large organizations. An industry analysis was also conducted and the representative heuristic and overconfidence bias still remained significant.

TABLE 1
Results of Logistic Regression Analysis

Independent Variables	Parameter Estimate	Wald Chi-Square
Intercept	-6.14***	14.77
Risk-taking	.05	.22
Conformity	.33**	7.35
Education	1.06***	25.13
Age	.02	1.07
Networking	- .01	2.04
Alertness	- .27+	3.60
Representativeness	1.79***	22.22
Overconfidence	- 2.87*	5.50
Pseudo-R^2	37.1	
Model Chi-Square	96.6***	
df	155	
Hit Ratio (%)	78	

+ $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$

DISCUSSION

Common experience suggests that entrepreneurs and managers in large organizations are, somehow, different from each other. It has been somewhat disconcerting that most academic efforts at discovering the sources of these experienced differences have met with limited success. This paper presents empirical evidence suggesting that entrepreneurs and managers in large organizations are different from one another, and that these differences are substantial in size. By applying the theory of biases and heuristics, this paper has shown that entrepreneurs and managers in large organizations think differently. Of course, future research will need to examine other biases and heuristics, to more completely explain the differences between entrepreneurs and managers in large organizations.

This research on two biases and heuristics helps resolve some counter-intuitive conclusions from previous work. For example, many psychological based studies have shown that the risk taking propensity of entrepreneurs is not greater than that of managers in large organizations (Low & MacMillan, 1988). This is true, even though, objectively, entrepreneurs seem to accept higher levels of risk in their career choices and business decisions than managers in large organizations. This apparent contradiction may be resolved by recognizing that the more extensive use of the overconfidence and representativeness by entrepreneurs is likely to lead them to perceive less risk in a given decision situation than managers. By being more willing to generalize from limited experience (representativeness), and by feeling more confident that they will be able to overcome any unforeseen challenges, entrepreneurs may conclude that a situation is simply less risky. Thus, it is not differences in risk propensity that distinguishes entrepreneurs from managers in large organizations, but the ways they perceive and think about risk.

These observations have a potentially important impact in analyzing the relationship between decision making and performance. If different individuals and organizations are cognitively biased in different ways, then they may make strategic choices in fundamentally different ways. If these cognitive biases are difficult to change, they may represent sources of sustained differences among individuals and firms. Such differences, in the field of strategic management, have been shown to be sources of sustained competitive advantage and sustained competitive disadvantage (Barney, 1991). By recognizing that strategic decisions can be non-rational in different ways, this research points to a possible connection between cognitive theories of decision making, strategic management, and firm performance. Of course, additional research will need to be conducted to examine these potential linkages.

In addition to extending this research to examine other kinds of biases and heuristics, future work will need to examine whether non-rational decision making remains stable over time. Some have argued that biases and heuristics are often applied in an unconscious manner (Kahneman et al., 1982), and thus, are relatively immune from change or modification. Alternatively, others have noted that decision biases can be corrected through training (Fong & Nisbett, 1991). If the use of biases and heuristics are stable over time, then it would follow that those who are uncomfortable with heuristics based decision making, on average, will remain associated with larger firms where this type of decision making is less frequently required. On the other hand, those who are comfortable with creating and relying on these decision making shortcuts are likely to be attracted to entrepreneurial settings where these decision skills are best utilized (Schneider, 1987). The assumption future research could address is whether individuals with different decision preferences will naturally and efficiently select into organizational contexts where those preferences are valued and accepted, such as into entrepreneurial firms.

There are several practical implications that emerge from this study as well. For example, most research on biases and heuristics focuses on decision errors caused by these deviations from rational decision making (Lopes, 1991). We speculate, without these biases and heuristics, many decisions would never be made. In entrepreneurial ventures, in particular, the window of opportunity would often be gone by the time all the necessary information became available for more rational decision making. Additionally, successfully starting a new business usually involves overcoming multiple hurdles. Using biases and heuristics as simplifying mechanisms for dealing with these multiple problems may be crucial. To face such hurdles from a rational perspective would not only postpone decisions, but would in all likelihood become overwhelming.

As an illustration of the possible benefits of biased decision making, consider the following. One entrepreneur from our sample wrote us because he took issue with the quantitative emphasis of our study. Overall, he rejected this systematic approach to decision making. He stated:

> *You see, people who are engaged in businesses such as mine, are rarely influenced by surveys because they don't place any stock in them. Survey reports, in general, are*

most highly prized by those individuals who lack sufficient knowledge of a matter in which they are required to make a decision. It is my considered opinion that those individuals are not going to be found successfully engaging in entrepreneurial businesses.

The use of biases and heuristics may also offer some help in explaining why entrepreneurs sometimes make bad managers. While the use of cognitive biases may be beneficial in some circumstances, it can lead to major errors in others (Tversky & Kahneman, 1974). While research has yet to establish performance implications, it is possible that the more extensive use of heuristics in strategic decision making may be a great advantage during the startup years. However, it may also lead to the demise of a business, particularly as a firm matures.

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