Entrepreneurial Risk and Strategic Decision Making

It's a Matter of Perspective

Lowell W. Busenitz
University of Oklahoma

Risk taking has long been a central theme of the entrepreneurship literature. However, research on the risk propensity of entrepreneurs has met with virtually no empirical support even though entrepreneurs consistently engage in risky events. This article attempts to resolve this paradox by examining entrepreneurial risk through the lens of cognitive psychology and decision making. The author proposes that entrepreneurial risk may be explained by recognizing that entrepreneurs use biases and heuristics more, which is likely to lead them to perceive less risk in a given decision situation. The data indicate that entrepreneurs do indeed use representativeness more in their decision making and are more overconfident than managers in large organizations. These findings provide a new perspective for understanding how entrepreneurs deal with the inordinate amount of risk associated with starting new ventures.

The dominant theme running throughout the entrepreneurship literature is risk and how entrepreneurs are predisposed toward risky alternatives or how they should manage risk (see d'Amboise & Muldowney, 1988; Hebert & Link, 1988, for a review). Clearly, starting entrepreneurial ventures based on new discoveries and innovations

The author would like to thank Norris Krueger, Dale Rude, and two anonymous reviewers for their helpful comments on previous versions of this article.

Lowell W. Busenitz is an associate professor in the Management Division in the Price College of Business at the University of Oklahoma.

THE JOURNAL OF APPLIED BEHAVIORAL SCIENCE, Vol. 35 No. 3, September 1999 325-340
© 1999 NTL Institute

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/24846

entails a great deal of risk, with failure estimates commonly ranging from 50% to 80% within the first 5 years of existence (Dun and Bradstreet, 1967). When new businesses pursue uncharted waters with the intent of achieving substantial growth and above average performance, risk is an inescapable reality. In addition to potentially losing their financial investments, entrepreneurs also risk career opportunities, family relationships, personal wealth, and psychic well-being (Bird, 1989). Consequently, entrepreneurs tend to carry a gambler-like reputation because of their willingness to quickly purse new markets (d'Ambroise & Muldowney, 1988; Stevenson & Gumpert, 1985).

Although it is clear that entrepreneurs consistently face an inordinate amount of risk, empirical evidence showing entrepreneurs to have a higher risk propensity has yielded little support (Brockhaus, 1980; Low & MacMillan, 1988). However, Cooper, Dunkelberg, and Woo (1988) observed that entrepreneurs generally perceive their chances for success to be much higher than fellow competitors starting in the same industries. The disparity between reality and empirical findings on risk propensity has led researchers to characterize entrepreneurial risk from a variety of perspectives including risk avoidance approaches (Miner, Smith, & Bracker, 1989; Ray, 1994; Raynor, 1974). Although entrepreneurs frequently foster important transformational changes (Bygrave & Timmons, 1992; Nutt & Backoff, 1997) through the risky ventures they undertake, little is understood about their vision and why they think the way they do. In a recent inquiry, Palich and Bagby (1995) found that entrepreneurs tend to be predisposed to cognitively categorize business situations more positively. The cognitive perspective provides an important perspective with which to investigate why some entrepreneurs accept an inordinate amount of risk even though, on average, they do not apparently differ in their risk-taking propensity. To further explore this phenomenon of risk within entrepreneurship, it is proposed that entrepreneurs use biases and heuristics more extensively in their decision making and, therefore, fail to fully acknowledge the risk associated with starting their own businesses. Stated differently, it may be that entrepreneurs take more risky paths because they perceive little risk in their proposed ventures.

Psychologists began examining entrepreneurial differences (Collins & Moore, 1964; McClelland, 1961) in part because of an intrigue with the risk that those who start their own firms clearly accept. A key assumption was that individuals who start entrepreneurial ventures are also likely to have a propensity to take chances, to be willing to expose themselves to situations with uncertain outcomes, and to thrive on dangerous situations (high risk propensity). However, this stream of research has yielded disappointing findings (Low & MacMillan, 1988). In the most widely cited study on the subject, Brockhaus (1980) reported that the risk propensity of entrepreneurs does not seem to differ significantly from the rest of the general population. Although a couple of studies have found some modest support for differences in risk propensity among entrepreneurs (Begley & Boyd, 1987; Sexton & Bowman, 1984), the emerging consensus is that entrepreneurs do not differ substantially in their risk-taking propensity (Low & MacMillan, 1988; Ray, 1994). This conclusion is widely held even though it is clear that entrepreneurs are regularly involved in starting ventures that are more likely to fail than succeed.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

This paradox, that entrepreneurs take more risk but do not have a higher risk propensity, has yet to be resolved. This article attempts to resolve this contradiction by examining entrepreneurial risk through the lens of cognitive psychology and decision making. Since Simon's (1955) early work, scholars have recognized that managerial decision making often falls short of a purely rational model (Fredrickson & Mitchell, 1984; Zajac & Bazerman, 1991). Cognitive psychologists, for example, have observed that people's perceptions of what constitutes a random event may not conform to what statistics would predict (Bar-Hillel, 1979; Lichtenstein & Fischhoff, 1977). Instead, decision makers frequently have conflicting biases and unjustified optimism. The frequent use of bias and heuristics in decision making (Kahneman & Lovallo, 1993; Tversky & Kahneman, 1974; Zajac & Bazerman, 1991) shows a clear departure from a normative interpretation of randomness. In sum, cognitive research suggests that decision makers tend to develop a set of decision rules and biases to explain the random events in their lives.

In their research on entrepreneurial risk, Palich and Bagby (1995) also found that entrepreneurs do not view themselves as risk takers. However, in taking a cognitive perspective, they found that due to schema accessibility, entrepreneurs simply tend to associate business situations with cognitive categories that suggest more favorable attributes (greater strengths versus weaknesses, opportunities versus threats, and potential for future performance improvement versus deterioration).

Building on this stream of research, we propose that increased use of biases and heuristics helps explain the risky ideas entrepreneurs often pursue. Using their specific biases and heuristics to filter their decisions, entrepreneurs are likely to perceive less risk in chosen business opportunities. By being more willing to generalize from limited experience, and by feeling overconfident that they will be able to master the major obstacles, entrepreneurs may oversimplify and conclude that their specific ventures are destined for success. Thus, it is not differences in risk propensity that distinguishes entrepreneurs from managers in large organizations but differences in the ways they perceive and think about risk.

In this context, biases and heuristics are decision rules, cognitive mechanisms, and subjective opinions people use to assist them in making decisions. Frequently, the use of biases and heuristics yields acceptable solutions to problems for individuals in an effective and efficient manner (Baron, 1998; Hogarth, 1987; Tversky & Kahneman, 1974). In this article, the term *biases and heuristics* will be used to refer to these simplifying strategies that individuals use to make decisions, especially in uncertain and complex conditions. We define entrepreneurs as those who have founded their own firms. Managers are individuals with middle- to upper-level responsibilities with substantial oversight in large organizations.

RISK AND DECISION MAKING

The phenomenon of entrepreneurial risk eventually attracted the attention of behavioral scientists. McClelland's (1961) influential work characterized the high

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

achieving entrepreneurs as also being moderate risk takers who prefer 50-50 probabilities (McClelland's entrepreneurial world included business executives and firm operators). The important study by Brockhaus (1980) also found entrepreneurs to be moderate risk takers with little difference between them and managers as well as the general public. Going beyond McClelland's moderate risk-taking perspective, Raynor (1974) asserted that success-oriented entrepreneurs should seek a much lower level of risk than the 50-50 probabilities of immediate risk recommended by McClelland. Raynor argued that doing so would allow entrepreneurs to lengthen their careers as business owners. Some empirical work examining successful entrepreneurs supports a relationship between risk avoidance and motivational patterns (Miner, 1990), company growth and capital raised (Miner et al., 1989), and environmental uncertainty as a moderator of the desire to avoid risk (Bellu, Davidsson, & Goldfarb, 1990). However, the assertion that entrepreneurs desire to avoid risk is based on subjective, not objective assessments of risks (Bellu, 1993). We also suspect that these findings are most applicable for entrepreneurs who have experienced a successful startup and for corporate entrepreneurs who very much desire to preserve the longevity of their established ventures.

The focus of this study is first of all to understand risk in the context of the startup process. In contrast to corporate entrepreneurs and successful entrepreneurs who have interests to protect, we suspect that entrepreneurs in the founding process tend not to be sensitized to the risk they face. Thus, asking entrepreneurs to engage in risk-reduction or risk-averse behavior is often inappropriate because they do not view their ventures as risky (Cooper et al., 1988). Broader research indicates that decision makers rarely address risk by first calculating and then choosing among the alternative risk-return combinations available (Heath & Tversky, 1991; March & Shapira, 1987; Schwenk, 1988). We argue that this is especially true for entrepreneurs.

In support of the idea of increased use of biases and heuristics, entrepreneurs may have such a strong belief in their ability to impact the venture process that they do not view themselves as engaging in risky endeavors (Bird, 1989; Zajac & Bazerman, 1991). Because of the market potential they visualize, entrepreneurs may readily view themselves as experts as they forge their new firms to capitalize on perceived opportunities (Baron, 1998; Gatewood, Shaver, & Gartner, 1995). By viewing an opportunity as unique and from the inside (Kahneman & Lovallo, 1993), entrepreneurs may vastly underestimate the risk of the opportunities they seek. They also may tend to ignore potential problems and factors they cannot control. Stated differently, they may accept risks, in part because they do not expect that they will have to bear them (Low & MacMillan, 1988). Thus, for understanding entrepreneurial behavior, the issue may not be one of risk propensity or the sensitivity to probability estimates of possible outcomes but, rather, in how entrepreneurs think about the decisions they make surrounding the business opportunities they undertake (Gatewood et al., 1995; Ray, 1994). Thus, we draw on literature from cognitive psychology and strategic decision making to develop a more unified framework for understanding how entrepreneurs think and why they make the decisions they do (Baron, 1998). By doing so, we gain some potentially

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

interesting insights into how entrepreneurs accept or cope with an inordinate amount of risk inherent in the perceived opportunities they attempt to seize.

One important class of nonrational decision-making models that are consistent with the satisficing principle (Simon, 1955) focuses on biases and heuristics (Kahneman & Tversky, 1972; Tversky & Kahneman, 1971). A broad range of empirical findings suggests that decision makers frequently apply heuristics to simplify their decision making and, as a result, often exhibit nonrational biases (Kahneman, Slovic, & Tversky, 1982). These findings consistently have shown that the expected utility paradigm is inadequate to describe how managers think about risk (March & Shapira, 1987). Rather, the tendency seems to be for decision makers to evaluate only a small number of alternatives and to focus on only a few key aspects of the problem (Krueger & Dickson, 1994) based on a few personal biases and decision rules (Kahneman & Lovallo, 1993). Increasingly, evidence indicates that individuals vary in the way they deal with risk (Krueger & Dickson, 1994; Shapira, 1995), and this may be particularly reflected in their use of specific biases and heuristics. For example, some individuals, such as entrepreneurs, may be more prone to biases stemming from various heuristics such as representativeness and overconfidence (Bazerman, 1990; Kahneman et al., 1982).

Biases and Heuristics in Entrepreneurial Decision Making

An assumption of this article is that there is a relationship between use of biases and heuristics in decision making and the likelihood of starting your own company. Decisions involving much uncertainty, where risk probabilities are virtually impossible to calculate, can overwhelm a more comprehensive decision maker. The uncertainty surrounding a start-up can be staggering unless one has a more biased perspective. Those who more readily use biases and heuristics may use them to make sense out of an uncertain situation through the application of their own decision rules.

The greater manifestation of biases and heuristics among entrepreneurs, and how that leads to the acceptance of greater risk, is likely for at least two reasons. First, entrepreneurs often act very quickly in deciding to start their own firms (Carter, Gartner, & Reynolds, 1996; Reynolds & Miller, 1992) as they act to exploit brief environmental windows of opportunity (Hambrick & Crozier, 1985). In such settings, extensive data collection and analyses to calculate risk probabilities and choose among alternative risk-return combinations are generally too time-consuming if not impossible to obtain (Gilmore & Kazanjian, 1989; Shapira, 1995). Heuristic-based decision making enables individuals to piece together various fragments of information and assimilate them based on decision rules to make faster decisions (Eisenhardt, 1989) before brief windows of opportunity close. As Tversky and Kahneman (1974) noted, heuristics provide intuitive guidelines that usually accelerate the decision process substantially. The influence of biases and heuristics, such as representativeness and overconfidence, may enable individuals to easily make decisions with incomplete information. The more extensive use of biases and heuristics in strategic decision making by

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

entrepreneurs also may help explain why they frequently start their ventures with minimal lead time.

Second, organizational norms that guide decision making in established organizations (Fredrickson & Iaquinto, 1989) are fundamentally different from what occurs in an entrepreneurial setting (Miller & Friesen, 1984). Without policies and procedures in place, individuals must use their own decision-making rules or heuristics to guide their decision making. These decision-making shortcuts may enable individuals to deal with the large amounts of unresolved uncertainty and to make decisions that must be made quickly and efficiently without full consideration of the risk involved. Thus, biases and heuristics and their use by entrepreneurs are central to understanding the entrepreneurial process. The use of biases and heuristics facilitates a perceived sense of overall understanding and a sense that the "rules of the game" are understood. More cautious decision makers will tend to function better in larger organizations in which more extensive information tends to be more readily available and in which various decision tools are more readily available. Additionally, decision makers in larger firms have more resources to collect data more systematically, analyze it more carefully, and thus make more risk-averse decisions.

A large number of biases and heuristics have been studied in the nonrational decision-making literature (Bazerman, 1990; Hogarth, 1987). From among all these biases and heuristics, we chose to examine differences between these sets of individuals with reference to two biases and heuristics: representativeness and overconfidence. Representativeness is one of the most widely referenced heuristics (e.g., Kahneman & Tversky, 1972; Katz, 1992). Overconfidence was chosen because of its similarity to a number of other biases and heuristics identified in the literature (Kahneman et al., 1982). Furthermore, Kahneman and Lovallo (1993) used both of these biases and heuristics to build their arguments for a cognitive perspective on risk taking.

Representativeness. In their description of representativeness, Tversky and Kahneman (1971) asserted that this heuristic was widely used in decision making. Decision makers manifesting this heuristic are willing to develop broad, and sometimes very detailed, generalizations about a person or phenomenon based on only a few attributes of that person or phenomenon. In an extreme form, an individual closely associated with a new project is likely to sketch a representative scenario that captures the essential elements of the history or the future (Kahneman & Lovallo, 1993). For example, if Bill once used a single piece of equipment manufactured by "Firm A" and strongly disliked it, the utilization of this heuristic would lead to a bias against all equipment made by that manufacturer.

The particular form of representativeness heuristic examined here is a willingness to generalize from small, nonrandom samples. The law of large numbers suggests that large random samples can be used to make rigorous inferences about population statistics. However, sometimes decision makers are willing to make such inferences, not from large random samples but from small, nonrandom samples. The most common type of small, nonrandom sample used as a basis for generalization is, of course, personal experience (Kahneman et al., 1982).

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

Again, there is little doubt that the representativeness heuristic, and especially the willingness to generalize from small, nonrandom samples, is a decision-making heuristic that may be particularly well suited for entrepreneurial settings (Katz, 1992). In such settings, there is rarely the time, or the institutional support, to obtain large random samples, even if they do exist. To make these risky decisions, entrepreneurs readily succumb to their own decision rules and to their sometimes narrow experience base. Entrepreneurs' insensitivity to risk will be manifested in their greater susceptibility to risk. Individuals who are less susceptible to heuristics stemming from small sample sizes are likely to be attracted to larger firms, in which the time and other resources needed to choose a more representative sample are likely to be available. These observations lead to the following hypothesis:

Hypothesis 1: As a reflection of their insensitivity to risk, entrepreneurs will be more willing to generalize from small sample sizes than managers in large organizations.

Overconfidence. This bias identifies how decision makers tend to be overly optimistic in their estimation abilities on receiving initial information (Alpert & Raiffa, 1982; Fischhoff, Slovic, & Lichtenstein, 1977; Oskamp, 1965), particularly when they are relatively unfamiliar with the problem and/or when substantial uncertainty exists (Lichtenstein, Fischhoff, & Phillips, 1982). Overconfidence emanates from the anchoring and adjustment heuristic (Bazerman, 1990; Tversky & Kahneman, 1974) and is one of the more commonly referenced decision-making biases (Hogarth, 1987; Schwenk, 1988). Decision makers tend to be overconfident in their initial assessments and slow to revise their initial judgments appropriately as additional information becomes available (Schwenk, 1988).

The issue of overconfidence among entrepreneurs has been studied by Cooper et al. (1988), who found that entrepreneurs assigned a substantially higher probability of success to their own ventures while assigning lower probabilities of success to other ventures like theirs. Overconfidence, as a decision-making bias, is likely to be a common phenomenon for decision makers in entrepreneurial settings. As suggested earlier, given the enormous decision-making uncertainty facing these individuals, and the speed with which decision making must occur (Eisenhardt, 1989), decisions will be made before "all the information is in." From a positive perspective, individuals are more likely to be willing to make risky decisions if they feel confident in their ability to implement them (Heath & Tversky, 1991). Consequently, individuals with a greater sense of overconfidence are likely to function better in an entrepreneurial setting because they will be less overwhelmed with the multiple hurdles they face. Individuals with less of a tendency toward overconfidence will be more attracted to larger organizations in which more risky decisions will generally be approached in a more programmed and systematic manner. These observations lead to the following hypothesis:

Hypothesis 2: As a reflection of their tendency to make more risky decisions, entrepreneurs will manifest more overconfidence in their decision making than managers in large organizations.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

METHOD

Measures

Representativeness. To measure the use of the representative heuristic, we followed the approach used by Fong and Nisbett (1991) and Fong, Krantz, and Nisbett, (1986) in which subjects were given scenarios representing various types of real-to-life strategic decisions. As in the scenarios developed by Fong and colleagues, both of our problems portrayed a strategic decision pitting two alternatives against one another. One alternative was based on quantitative/statistical information, whereas the other was based on heuristic reasoning. Problem 1 involved the purchase of a major piece of equipment, whereas Problem 2 depicted an automation update decision (see the appendix for these two problems). Subjects were told to decide between the two alternatives for each problem and then to describe their reasoning for reaching the designated decision. Coders then analyzed these responses to determine whether heuristic-type reasoning was used by the respondents to answer these scenarios.

The coding schema used to analyze the responses also closely paralleled that of Fong et al. (1986) and Fong and Nisbett (1991). A code of 1 was given for responses that contained no mention of statistical reasoning but relied instead on subjective opinions or simple "rules of thumb." Examples of this form of reasoning included reference to personal experience or simple decision rules like "buy American" and "personal experience." A code of 0 was given for responses that contained some form of statistical reasoning, including references to variability or sample size. There were 17 responses that were uncategorizable due to a lack of information given by the respondent and were, therefore, omitted from subsequent analyses.

After some initial training, all responses were coded blind to conditions according to these criteria by two individuals (the author and a graduate student). There was exact agreement between Coder 1 and Coder 2 84% of the time across the two problems. In cases in which disagreement existed, the evaluation of a third coder (another graduate student) was used to resolve the disparity. These results were then summed across the two problems to create a single three-category variable (0-2). A sum of 0 indicates statistical reasoning in both scenarios, 1 indicates a mix response, and 2 indicates heuristic reasoning was used throughout.

Overconfidence. To measure overconfidence, the procedure used in the widely cited studies conducted by Fischhoff et al. (1977) and Lichtenstein and Fischhoff (1977) was replicated. A series of five questions based on death rates from various diseases and accidents in the United States was developed. All items were dichotomous in nature with the general form of "Which cause of death is more frequent in the United States? A. Cancer of all types, B. Heart disease." One of the two choices is correct based on the most recent vital statistics report prepared by the National Center for Health Statistics. Subjects were asked to make two responses to each item. First, they were to choose one of the two alternatives as their best guess of the correct alternative.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

Second, they indicated, on a provided scale ranging from 50% to 100%, the level of confidence they had in their answer. In the instructions, they were told that 50% would indicate that their answer was a total guess, whereas 70% would indicate that they thought they had 7 chances in 10 of being correct. A response of 100% would indicate that they were totally confident that their choice was right. Again, in taking our cues from the earlier work of Lichtenstein and Fischhoff, all "level of confidence" responses were grouped into one of six probability categories: .50 to .59, .60 to .69, .70 to .79, .80 to .89, .90 to .99, and 1.00 for analysis purposes. Those probability responses that were in the .50 to .59 range were coded as .50, .60 to .69 responses were coded as .60, and so forth.

For the purpose of statistical analyses on each observation, a confidence score was computed. Again, following the lead of Fischhoff et al. (1977), this was done by noting the mean probability response across all items for each subject and the percentage of items for which the correct alternative was selected. The difference between these two scores then becomes a measure of overconfidence or underconfidence (a positive score indicates overconfidence, whereas a negative score indicates underconfidence; the higher the score, the greater the overconfidence). For example, a respondent who answered .50, .60, .70, .70, and .90 and gave the correct answer three out of five times would receive an overconfidence score of .08 (mean of .68 minus .60).

Risk propensity, education, and age. Although previous research on differences in risk propensity between entrepreneurs and managers in large organizations has generated mixed results, we wanted to control for this trait. Risk propensity was assessed by using the Jackson Personality Inventory (Jackson, 1976), which consists of 16 dichotomous items. Jackson (1977) reported reliability coefficients of .81 to .84 for risk propensity in terms of scale homogeneity and test-retest stability. Sexton and Bowman (1984) reduced this risk propensity scale developed by Jackson to 8 items to better accommodate survey research. The use of this 8-item risk propensity dichotomous scale yielded a Kuder-Richardson-20 (KR-20) reliability coefficient of .77, with scores ranging from 0 to 8. Because the use of biases and heuristics may vary with age and education, we also inserted the birth year of the respondents as a control variable.

Sampling

Samples from two populations were drawn: a sample of entrepreneurs and a sample of managers in large organizations. Survey research was used to collect the primary data.

The sample of entrepreneurs. The sales tax file of a state comptroller's office was used to identify potential entrepreneurs because of its superior capability for identifying new businesses (Busenitz & Murphy, 1996). These files contain the name and address of the owner, organization, organization type, SIC code, and date of first sale. A sample of firms showing a date of first sale within the past 2 years and having an SIC code in the 2800, 2900, 3000, 3500, 3600, 3700, and 3800 categories was selected.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

These SIC categories include the manufacturing of plastics, electronics, and instruments. A priori, it was thought that these categories would represent a higher percentage of newly emerging firms because they represent more dynamic industries. This procedure resulted in a sample of 573 entrepreneurs. A mail questionnaire was developed and sent to the identified sample. A total of 176 responses from entrepreneurs were received, for a 31% response rate.

Because, historically, identifying entrepreneurs has been somewhat problematic (Gartner, 1988), we wanted to be more precise in our operationalization. Our operationalization consisted of two dimensions. First, respondents had to have been a founder of the identified firm. Being responsible for an independent start-up is widely used as a distinguishing feature of entrepreneurship (Begley & Boyd, 1987; Cooper et al., 1988) and, thus, was used here as a prerequisite for inclusion in the sample for this study. With the second dimension, subjects had to be currently involved in the start-up process. This was operationalized by requiring our subjects to have started their venture within the last 2 years and/or currently planning on starting another venture within the next 5 years. These restrictions resulted in 124 usable responses. The average time since founding for the entrepreneurs included in this sample was 1.7 years. The 52 omissions occurred because either they were not the founder (e.g., they had purchased or inherited the firm) or had founded the firm more than 2 years ago and they were not currently contemplating another start-up. To test for a biased response, nonrespondents 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, $\chi^2(5) = 1.782$, $p = .878$.

Managers in large organizations. 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, research and development, and manufacturing) and work for publicly owned organizations with more than 10,000 employees. These managers are often referred to as divisional or general managers because they oversee multiple functional areas (e.g., marketing, research and development, accounting, manufacturing). This classification of managers was chosen because their work most closely parallels the work of entrepreneurs (versus the top-level corporate executives who regularly deal with mergers and acquisitions, public financial markets, and other external stakeholders). To be included in this study, the managers had to oversee at least two functional areas (the sample average was 4.55 functional areas). Contact was made with three organizations, and two agreed to participate in the study. Data collection was coordinated through the human resource departments of the respective organizations with a company cover letter attached. Usable responses were received from 95 of the 176 managers to whom surveys were sent, for a usable response rate of 54%. The SIC for the managers included in this sample came from the 1300, 3400, 3500, 3600, and 3800 segments. The results of the chi-square test on the SIC variable between usable responses and nonrespondents again suggest that the response was not biased, $\chi^2(4) = 3.973$, $p = .59$.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

TABLE 1
Means, Standard Deviations, and Correlations

Variable	*Mean*	SD	*1*	*2*	*3*	*4*	*5*
1. Entrepreneurs/managers							
2. Education entrepreneurs	2.78	1.18					
Education managers	4.03	1.00	–0.49**				
3. Age entrepreneurs	44.12	11.62					
Age managers	45.12	6.21	–0.05	0.01			
4. Risk-propensity entrepreneurs	5.20	2.42					
Risk-propensity managers	5.14	2.33	0.02	0.056	–0.01		
5. Representativeness entrepreneurs	1.10	0.78					
Representativeness managers	0.42	0.54	0.44**	0.33**	–0.7	–0.04	
6. Overconfidence entrepreneurs	0.07	0.19					
Overconfidence managers	0.009	0.185	0.16*	–0.11	0.02	–0.04	–0.04

*$p < .05$. **$p < .01$.

RESULTS

Table 1 presents the means, standard deviations, and correlation coefficients among all variables. In this study, managers in large organizations were coded as 1, whereas the entrepreneurs were coded as 2. The correlations show that the overconfidence and representativeness variables are significantly related to being an entrepreneur versus a manager in a large organization. These zero-order correlations indicate preliminary support for the hypotheses.

One-way ANOVA analysis was also used to examine possible differences in scores between entrepreneurs and managers in large organizations. The mean score with the representative heuristic was 1.24 for entrepreneurs versus 0.53 for managers ($F = 50.16$, $p < .001$). As for overconfidence, entrepreneurs scored a mean of 0.106, whereas managers scored 0.045 ($F = 5.53$, $p < .05$). As for the control variables, only education was significant with managers, on average, having a higher level of formal education (4.24 vs. 2.98; $F = 68.87$, $p < .001$). Notably, we found now differences in the risk propensity (the mean score for the entrepreneurs was 5.47 vs. 5.12 for the managers in large organizations, $F = 1.08$, *ns*).

Further analysis was conducted using a multivariate approach. Because our dependent variable is dichotomous (managers in large organization were scored as 1 and entrepreneurs as 2), logistic regression was employed as the primary test of the hypotheses. The results presented in Table 2 show that entrepreneurs are more likely to be affected by representativeness and overconfidence than are managers in large organizations. Even after controlling for education, age, and risk propensity, the biases and heuristic effects endure. Taken together, these results suggest that the way entrepreneurs approach and deal with risky decisions is significantly different from that of managers of large organizations. These data indicate that entrepreneurs do not view

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

TABLE 2
Results of Multivariate Analysis: Logistic Regression

Independent Variables	*Parameter Estimate*	*Wald Chi-Square*
Intercept	2.12	3.1
Education	–0.91***	30.02
Age	–0.01	0.38
Risk propensity	0.118	2.016
Representativeness	1.46***	22.97
Overconfidence	2.19*	4.54
Pseudo R^2		0.33
Model chi-square		89.7***
df		190
Hit ratio (%)		78

NOTE: As noted in the Method section, 52 observations were omitted from our entrepreneurship sample to control for a possible success bias because either the respondent was not the founder (e.g., he or she had purchased or inherited the firm) or had founded the firm more than 2 years ago and was not contemplating another start-up in the near future. However, the above model was rerun to include these 52 observations. The significance levels of all variables remained unchanged from those reported above.
*$p < .05$. ***$p < .001$.

themselves as preferring more risky adventures as shown in the risk propensity scores, but they do use biases and heuristics more readily to evaluate their decisions. The use of biases and heuristics is an important breakthrough in understanding entrepreneurial decision making.

CONCLUSION AND DISCUSSION

The importance of transformational change (Nutt & Backoff, 1997) and the risk entrepreneurs encounter has long been a central part of the entrepreneurship literature (d'Amboise & Muldowney, 1988; Low & MacMillan, 1988). However, it has been somewhat disconcerting that most academic efforts to test entrepreneurs for a higher risk propensity have met with limited success even though they consistently engage in more risky events. This article presents empirical evidence indicating that entrepreneurs use biases and heuristics in their decision making more extensively than managers in large organizations do. Together with the Palich and Bagby (1995) findings that entrepreneurs tend to look at business opportunities more positively, we now have an important new window from which to probe how entrepreneurs think about and deal with risk.

First, these findings help explain why entrepreneurs have consistently not been found to have a higher risk propensity. Entrepreneurs do not view themselves as being more desirous of risky adventures. Furthermore, these findings indicate that entrepreneurs do not approach the starting of a new venture from a sequential and methodological perspective. If they approached the start-up process in a more comprehensive manner, the venture would probably never be started due to the lack of information, or,

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

where sufficient information was available, the probabilities of success would be so low that the venture would rarely be pursued. However, with entrepreneurs, their biases and heuristics indicate that there is a major opportunity to be capitalized on and/or that problems with fulfilling their expectations for the venture do not exist or will be addressed later.

A second implication of this study addresses the contextual versus person-specific nature of the risk. Some studies have concluded that risk is highly contextual (March & Shapira, 1987; Ray, 1994). However, given that this study found consistent differences across our samples of entrepreneurs and managers in how they responded to two different decision scenarios and death-rate questions, it suggests that how one responds to risky situations is more than just contextual. Those who are more susceptible to the use of biases and heuristics may actually gravitate toward and function better in more uncertain and risky situations. Of course, additional research is needed to further examine this conclusion.

Some authors have argued for ways to improve one's decision making by protecting against the influence of biases and heuristics (Bazerman, 1990; Russo & Schoemaker, 1989). However, in the entrepreneurship context, the use of biases and heuristics may be potentially advantageous. Without using biases and heuristics extensively, most new ventures would never get launched within an appropriate window of opportunity. Thus, a third potential implication of this study is that biases and heuristics may be important mechanisms that entrepreneurs use to sift through a large diversity of information in the face of much uncertainty. As Stevenson and Gumpert (1985) stated, "successful risk takers have the confidence to assume that the missing elements of the pattern will take shape as they expect" (p. 88).

The puzzle of starting a new venture is usually very scrambled, and those individuals who use heuristics more extensively to assist in their strategic decision making are the only ones who are most likely to attempt such a start-up. Although there are no doubt shortcomings to an entrepreneur's clouded or naive perceptions of risk, such an approach may help explain why entrepreneurs are frequently able to transform an idea into a growing enterprise. In other words, it may be the naiveness of the risk involved that enables entrepreneurs to forge ahead with their new ideas. If entrepreneurs would carefully calculate all the risks involved in starting a new venture, most new ventures would never be started. Stated differently, some individuals may have a competitive advantage in dealing with the risk inherent in new business start-ups. Of course, future research needs to examine more carefully these implications. Also, building on the work of Raynor (1974), Miner (1990), and others, it might be interesting to investigate if and when insensitivity to risk via the use of biases and heuristics moves from being an advantage in the start-up process to becoming a disadvantage as the organization grows and matures.

The use of biases and heuristics may also offer some help in explaining why entrepreneurs sometimes make bad managers (Schell, 1991). Although the use of biases and heuristics can be very beneficial, it may lead to major errors in evaluating the riskiness of key strategic decisions. Although research has yet to establish performance implications, it is possible that the more extensive use of heuristics in strategic

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

decision making may be a great advantage during the start-up years. However, it also may tend to lead to the demise of a business, particularly as a firm matures.

Finally, understanding the perspective of entrepreneurs, as reflected in their use of biases and heuristics, provides an important window into understanding how they function and why they undertake risky endeavors. If researchers do not understand how entrepreneurs view risk, then it is going to be very difficult to help entrepreneurs develop strategies for coping with various risks and help them manage risk.

APPENDIX

Problem 1: Equipment Purchase Decision

Mr. Johnson is about to invest in a new machine and has narrowed his options to Machine A, which is made in the United States, or Machine B, which is made overseas. Both machines are equally capable of performing the same function. In considering this decision, Mr. Johnson said to his friend, "You know, it seems that every time I buy a piece of equipment made by a foreign manufacturer, it breaks down in the first month of use."

After further discussion, Mr. Johnson's friend remembers a recent industrial report that gives a significantly higher ranking to Machine B (the one made overseas) than to Machine A. This report bases its recommendation on extensive testing as well as on feedback from dozens of users. If you were in Mr. Johnson's position, which machine would you purchase? Why?

Problem 2: Automation Update Decision

The president is urging the board of directors to accept the purchase of a state-of-the-art computerized machine that would fundamentally change their operations. After describing the capability of this machine, the president cites a recent nationwide study that examined 120 businesses making similar upgrades. Results indicated that at least 85% showed a sizable increase in productivity. In a parallel control group of firms not making the upgrade, about half as many firms (40%) showed a sizable increase in productivity. Based on this study, the president concludes that the computerized machine needs to be purchased.

One of the directors now takes the floor giving two reasons why computerized equipment is not the real reason for increased productivity. First, the managers of businesses that make such changes are likely to be more energetic and adventurous, thus creating an environment for superior performance. Second, any change is likely to lead to superior performance because of the increased interest and commitment on the part of management.

If you were participating in such a decision, whose line of reasoning (president or director) would you be more likely to accept? Why?

REFERENCES

Alpert, M., & Raiffa, H. (1982). A progress report on the training of probability assessors. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 294-305). New York: Cambridge University Press.

Bar-Hillel, M. (1979). The role of sample size in sample evaluation. *Organizational Behavior and Human Performance, 24,* 245-257.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

Baron, R. A. (1998). Cognitive mechanisms in entrepreneurship: Why and when entrepreneurs think differently than other people. *Journal of Business Venturing*, *13*, 275-294.
Bazerman, M. H. (1990). *Judgment in managerial decision making* (2nd ed.). New York: John Wiley.
Begley, T. M., & Boyd, D. P. (1987). Psychological characteristics associated with performance in entrepreneurial firms and smaller businesses. *Journal of Business Venturing*, *2*, 79-93.
Bellu, R. (1993). Task role motivation and attributional style as predictors of entrepreneurial performance: Female sample findings. *Entrepreneurship and Regional Development*, *5*, 331-344.
Bellu, R., Davidsson, P., & Goldfarb, C. (1990). Towards a theory of entrepreneurial behavior: Empirical evidence from Israel, Italy and Sweden. *Entrepreneurship and Regional Development*, *2*, 195-209.
Bird, B. J. (1989). *Entrepreneurial behavior.* Glenview, IL: Scott, Foresman.
Brockhaus, R. H. (1980). Risk taking propensity of entrepreneurs. *Academy of Management Journal*, *23*, 509-520.
Busenitz, L. W., & Murphy, G. B. (1996). New evidence in the pursuit of locating new businesses. *Journal of Business Venturing*, *11*, 221-231.
Bygrave, W. D., & Timmons, J. (1992). *Venture capital at the crossroads*. Cambridge, MA: Harvard Business School Press.
Carter, N., Gartner, W. B., & Reynolds, P. D. (1996). Exploring start-up events sequences. *Journal of Business Venturing*, *11*, 151-166.
Collins, O. F., & Moore, D. G. (1964). *The enterprising man*. East Lansing, MI: MSW Business Studies.
Cooper, A. C., Dunkelberg, W. C., & Woo, C. Y. (1988). Entrepreneurs' perceived chances for success. *Journal of Business Venturing*, *3*, 97-108.
d'Amboise, G., & Muldowney, M. (1988). Management theory for small business: Attempts and requirements. *Academy of Management Review*, *13*(2), 226-240.
Dun and Bradstreet. (1967). *Patterns of success in managing a business*. New York: Author.
Eisenhardt, K. (1989). Making fast strategic decisions in high-velocity environments. *Academy of Management Journal*, *32*, 543-576.
Fischhoff, B., Slovic, P., & Lichtenstein, S. (1977). Knowing with certainty: The appropriateness of extreme confidence. *Journal of Experimental Psychology: Human Perception and Performance*, *3*, 552-564.
Fong, G. T., Krantz, D. H., & Nisbett, R. E. (1986). The effects of statistical training on thinking about everyday problems. *Cognitive Psychology*, *18*, 253-292.
Fong, G. T., & Nisbett, R. E. (1991). Immediate and delayed transfer of training effects in statistical reasoning. *Journal of Experimental Psychology: General*, *120*(1), 34-45.
Fredrickson, J. W., & Iaquinto, A. L. (1989). Inertia and creeping rationality in strategic decision processes. *Academy of Management Journal*, *32*(3), 516-542.
Fredrickson, J. W., & Mitchell, T. A. (1984). Strategic decision processes: Comprehensiveness and performance in an industry with an unstable environment. *Academy of Management Journal*, *27*, 399-423.
Gartner, W. B. (1988). Who is an entrepreneur? Is the wrong question. *American Journal of Small Business*, *12*(4), 11-32.
Gatewood, E., Shaver, K., & Gartner, W. (1995). A longitudinal study of cognitive factors influencing start-up behaviors and success at venture creation. *Journal of Business Venturing*, *10*, 371-391.
Gilmore, T. N., & Kazanjian, R. K. (1989). Clarifying decision making in high-growth ventures: The use of responsibility charting. *Journal of Business Venturing*, *4*, 69-83.
Hambrick, D. C., & Crozier, L. (1985). Stumblers and stars in the management of rapid growth. *Journal of Business Venturing*, *1*(1), 31-45.
Heath, C., & Tversky, A. (1991). Preferences and beliefs: Ambiguity and competence in choice under uncertainty. *Journal of Risk and Uncertainty*, *4*, 5-28.
Hebert, R., & Link, A. (1988). *The entrepreneur: Mainstream views and radical critiques*. New York: Praeger.
Hogarth, R. M. (1987). *Judgement and choice: The psychology of decisions*. New York: John Wiley.
Jackson, D. N. (1976). *Jackson Personality Inventory manual*. Goshen, NY: Research Psychologists Press.
Jackson, D. N. (1977). Reliability of the Jackson Personality Inventory. *Psychological Reports*, *40*, 613-614.
Kahneman, D., & Lovallo, D. (1993). Timid choices and bold forecasts: A cognitive perspective on risk taking. *Management Science*, *39*(1), 17-31.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016

Kahneman, D., Slovic, P., & Tversky, A. (1982). *Judgment under uncertainty: Heuristics and biases*. New York: Cambridge University Press.

Kahneman, D., & Tversky, A. (1972). A subjective probability: A judgment of representativeness. *Cognitive Psychology, 3*, 430-454.

Katz, J. A. (1992). A psychosocial cognitive model of employment status choice. *Entrepreneurship Theory and Practice, 17*(1), 29-37.

Krueger, N., & Dickson, P. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences, 25*, 385-400.

Lichtenstein, S., & Fischhoff, B. (1977). Do those who know more also know more about how much they know? *Organizational Behavior and Human Performance, 20*, 159-183.

Lichtenstein, S., Fischhoff, B., & Phillips, L. (1982). Calibration of probabilities: The state of the art to 1980. In D. Kahneman, P. Slovic, & A. Tversky (Eds.), *Judgment under uncertainty: Heuristics and biases* (pp. 306-334). New York: Cambridge University Press.

Low, M. B., & MacMillan, I. C. (1988). Entrepreneurship: Past research and future challenges. *Journal of Management, 14*(2), 139-161.

March, J. G., & Shapira, Z. (1987). Behavioral decision theory and organizational decision theory. In G. R. Ungson & D. N. Braunstein (Eds.), *Decision making: An interdisciplinary inquiry* (pp. 92-115). Boston: Kent.

McClelland, D. C. (1961). *The achieving society.* Princeton, NJ: Van Nostrand.

Miller, D., & Friesen, P. H. (1984). *Organizations: A quantum view.* Englewood Cliffs, NJ: Prentice Hall.

Miner, J. B. (1990). Entrepreneurs, high growth entrepreneurs, and managers: Contrasting and overlapping motivational patterns. *Journal of Business Venturing, 5*, 221-234.

Miner, J. B., Smith, N. R., & Bracker, J. S. (1989). Role of entrepreneurial task motivation in the growth of technologically innovative firms. *Journal of Applied Psychology, 74*(4), 554-560.

Nutt, P. C., & Backoff, R. W. (1997). Facilitating transformational change. *Journal of Applied Behavioral Science, 33*(4), 490-508.

Oskamp, S. (1965). Overconfidence in case-study judgments. *Journal of Consulting Psychology, 29*, 261-265.

Palich, L. E., & Bagby, D. R. (1995). Using cognitive theory to explain entrepreneurial risk-taking: Challenging coventional wisdom. *Journal of Business Venturing, 10*, 425-438.

Ray, D. M. (1994). The role of risk-taking in Singapore. *Journal of Business Venturing, 9*(2), 157-177.

Raynor, J. O. (1974). Future orientation in the study of achievement motivation. In J. W. Atkinson & J. O. Raynor (Eds.), *Motivation and achievement* (pp. 121-154). New York: John Wiley.

Reynolds, P., & Miller, B. (1992). New firm gestation: Conception, birth, and implications for research. *Journal of Business Venturing, 7*, 405-417.

Russo, J. E., & Schoemaker, P.J.H. (1989). *Decision traps.* New York: Doubleday.

Schell, J. (1991). In defense of the entrepreneur. *Inc., 13*(5), 28-30.

Schwenk, C. R. (1988). The cognitive perspective on strategic decision making. *Journal of Management Studies, 25*(1), 41-55.

Sexton, D. L., & Bowman, N. (1984, August). *The effects of pre-existing psychological characteristics on new venture initiations*. Paper presented at the annual meeting of the Academy of Management, Boston.

Shapira, Z. (1995). *Risk taking: A managerial perspective*. New York: Russell Sage Foundation.

Simon, H. A. (1955). A behavioral model of rational choice. *Quarterly Journal of Economics, 69*, 99-118.

Stevenson, H. H., & Gumpert, D. E. (1985). The heart of entrepreneurship. *Harvard Business Review, 63*(2), 85-94.

Tversky, A., & Kahneman, D. (1971). The belief in the "law of small numbers." *Psychological Bulletin, 76*, 105-110.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*, 1124-1131.

Zajac, E. J., & Bazerman, M. H. (1991). Blind spots in industry and competitor analysis: Implications of interfirm (mis)perceptions for strategic decisions. *Academy of Management Review, 16*(1), 37-56.

Downloaded from jab.sagepub.com at UNIV OF OKLAHOMA on January 20, 2016