

MBA Admission Criteria and an Entrepreneurial Mind-Set: Evidence From “Western” Style MBAs in India and Thailand

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We investigate the assessments of career attractiveness by 283 MBA students from India and Thailand, to use GMAT and work experience to explain variance in mind-sets that have previously been associated with successful managers. The fast-moving global economy requires managers to have an entrepreneurial mind-set, yet we find that MBA students with higher GMAT scores have career mind-sets that are more averse to work effort and to risk, and therefore, the GMAT may discriminate against applicants with a greater propensity to behave entrepreneurially.

“The successful future strategists will exploit an entrepreneurial mind-set . . . the ability to rapidly sense, act, and mobilize, even under uncertain conditions.”
—McGrath & MacMillan, 2000: xv

In developing and nurturing an entrepreneurial culture within an organization, Ireland, Hitt, and Sirmon (2003) suggested that successful leaders will need to employ an entrepreneurial mind-set and described the cognitive tasks involved, such as making sense of opportunities in the context of changing goals, constantly questioning one’s “dominant logic” in the context of a changing environment, and revisiting “deceptively simple questions” about what we think to be true about markets and the firm. While these characteristics are considered desirable qualities in future business leaders, there is an ongoing debate about whether business school graduates are well positioned to be

successful managers in today’s competitive environment (e.g., Feldman, 2005; Mintzberg, 2004; Pfeffer & Fong, 2002).

Dreher and Ryan (2004: 87) argued that “a systematic evaluation of current MBA admissions is the first step in ensuring that program graduates are prepared to meet the needs of employing organizations.” Selection procedures rely heavily on the Graduate Management Admissions Test (GMAT) score and prior work experience. Other selection criteria, such as prior academic achievement (GPA) and responses to interviewer questions are deemed less reliable indicators of student quality because academic grading standards differ widely across universities and across nations, and it is impossible for all applicants to be interviewed by the same person or panel of interviewers. The GMAT is used because it has been found to be predictive of academic success (Bieker, 1996; Daft, 1979; Gayle & Jones, 1973; Wright & Palmer, 1994) and it allows some substantial measure of comparability across different educational backgrounds and national origins. Because it has been used as a criterion by accrediting bodies for business schools (AACSB, 1988), and as a criterion used

We would like to thank Richard Klimoski (associate editor) and two anonymous reviewers for their insightful comments on earlier versions of this paper.

in the quality rankings of business schools (*U.S. News & World Report*, 2004), its use by business schools is reinforced. Number of years of postgraduate work experience is also widely used as a requirement for MBA program admission (Dreher & Ryan, 2004). The GMAT and other graduate admission tests are designed to assess potential students' general cognitive abilities (Kuncel, Hezlett, & Ones, 2001), and there is substantial evidence that they are predictive of academic performance, but there is a distinct leap between doing well in the MBA and being an effective manager. Performance as manager after graduation is based on *both* knowledge and key attitudes that make up a managerial mind-set. A mind-set represents the evaluative judgment based on the integration of cognitive and affective reactions to an object (Crano & Prislin, 2006: 347). Are we selecting individuals that, as graduates, will have the mind-sets for undertaking the tasks, making the decisions, and taking the risks necessary to ensure the global competitiveness and the ongoing rejuvenation of their firms?

In this study we investigate 9,056 assessments of career attractiveness, nested within 283 MBA students enrolled in top "Western style" MBA programs in India and Thailand to determine the ability of the GMAT and work experience to explain variance in mind-sets that are associated with successful managers. In doing so, we make four primary contributions to the literature on business school selection and education.

First, tests of selection criteria have used either proximal measures that capture performance in the MBA program (e.g., overall GPA; Gayle & Jones, 1973; Wright & Palmer, 1994) or distal measures of work performance (e.g., post-MBA work tenure Dreher & Ryan, 2002). Both types of research have made important contributions to the literature, but questions remain about whether proximal dependent variables of performance in MBA programs are associated with the practice of management (e.g., Ghoshal, 2005; Mintzberg, 2004) and it is no surprise that results for distal dependent variables have been weak given the many possible intervening variables. We complement these two approaches by using students' attitudes toward their future careers as managers as an indication of their entrepreneurial mind-set—a dependent variable more distal than grades but more proximal than work performance.

Second, it seems that the GMAT score and work experience are widely believed to capture individuals' management-related abilities, although the Graduate Management Admissions Council (GMAC) website home page (www.gmac.com) explicitly denies that the GMAT measures business knowl-

edge, job skills, motivation, creativity, or interpersonal skills. While some studies have focused on the predictive validity of the GMAT and performance in academic programs (e.g., Gayle & Jones, 1973; Hancock, 1999), other studies have included the predictive validity of work experience (Carver, Jr., & King, 1994; Dreher & Ryan, 2000). Rarely though, are other dimensions of ability controlled for (for an exception see Dreher & Ryan, 2004). We consider concomitantly the GMAT, work experience, and other human capital variables.

Third, debate over the effectiveness of the GMAT as a selection criterion has typically been over the amount of variance it explains in the dependent variable (typically MBA GPA). Recently there have been calls for investigations into a broader set of performance outcomes than GPA (Oswald, Schmidt, Kim, Ramsay, & Gillespie, 2004). We find that the GMAT score is negatively associated with what are considered mind-sets consistent with successful managers. This finding has important implications for future research, and possibly for discussions about whether selection criteria should also consider mind-sets associated with successfully managing today's firms in conjunction with those general cognitive tests predictive of performance in the MBA.

Finally, research on the selection criteria for MBA programs has typically focused on samples of MBA students in the United States. We offer a different sample: MBA students enrolled in top "Western style" MBA programs in India and Thailand. Of interest here is that Koys (2005) found the GMAT to be valid for non-U.S. students, indicating a global convergence of knowledge that underlies business aptitude. Although care must be taken in generalizing from this sample to other MBA students, or to Indian or Thai citizens more generally, these are important samples in their own right, given the status of India and Thailand as emerging economies in Asia and as potential major players in the global economy.

In the next section, we describe the GMAT and review empirical research on its predictive validity. We then highlight the use of work experience as a selection criterion, offer possible reasons for its use, and review the results of empirical research on its predictive validity. After establishing some of the important aspects of a mind-set for management success in today's competitive environment, we describe our research method for testing the relationship between the two main selection criteria and the mind-sets of MBA candidates. Finally, we report and then discuss the implications of our findings.

MBA ADMISSIONS

The Graduate Management Admissions Test (GMAT)

In 1953, representatives of nine graduate business schools—Columbia University, Harvard University, Northwestern University, Rutgers University, Seaton Hall University, University of Chicago, University of Michigan, University of Pennsylvania, and Washington University (St Louis)—developed, funded, and launched the Admission Test for Graduate Study in Business (now the Graduate Management Admission Test; Chestang, 2004: 35). The GMAT is “designed to measure basic verbal, mathematical and analytical writing skills” (www.gmac.com) that are associated with better academic performance in MBA programs. The GMAT is a multiple choice test primarily intended for applicants to business schools and consists of three sections: (1.) Two 30-minute essays to be written on the computer; (2.) one 75-minute, 37-question math section; and (3.) one 75-minute, 41-question verbal section (*BusinessWeek*, 2002). The results of the test are reported in terms of a verbal score, a math score, and an overall score. The overall score is standardized to have a mean of 500 and a standard deviation of 100, and therefore, ranges from a minimum score around 200 to a maximum score around 800.

“Nearly 3,000 graduate management programs worldwide either require the exam or use it as part of the admissions process . . . [with] over 200,000 GMAT tests taken annually at some 500 testing sites” (Lieberman, 2002: 35) in 150 countries around the world (www.gmac.com). Indeed, GMAT test takers numbered 211,010 worldwide in 2005, up 3.5% over 2004, with about one third of these outside the United States (*Graduate Management News*, 2006). A substantial global industry has grown to supply coaching and instructional services that purport to help individuals receive higher GMAT scores. One company boasts a “higher score guaranteed” (*Canadian Business*, 2005). Why has the GMAT become so popular? In an article celebrating the GMAT turning 50, the chief operating officer at the Graduate Management Admissions Council (which administers the test) concludes:

Schools throughout the world that use and require the GMAT® understand that selective admissions are essential to producing quality programs, assembling talented classes, and graduating successful and influential business leaders. The strength of the GMAT® and the promise of the MBA go hand in hand, and both are made possible by business schools (Chestang, 2004: 35).

Similarly, Don Martin, associate dean for enrollment management at the University of Chicago’s Graduate School of Business claims that the GMAT accurately measures ability: “A student’s score often predicts her academic success during the first year of an MBA program” (Lieberman, 2002: 35).

There is empirical research that supports some of these claims about the GMAT’s predictive validity. A number of studies have found that for samples of MBA students, those with higher GMAT scores had better performance in MBA classes, such as higher GPAs. Specifically, the GMAT score has been found to explain 17–18% of the variance in MBA GPA (Gayle & Jones, 1973; Wright & Palmer, 1994) but substantially less in other studies; more like 5–8% (Hancock, 1999; Nilsson, 1995). The Graduate Management Admissions Council (GMAC) which administers the test, claims (www.gmac.com see ‘GMAT Quick Facts/FAQs’) that the average predictive power of the GMAT score for MBA GPA is 0.41, increasing to 0.47 when undergraduate GPA is also included in the predictive equation, and that other issues, such as motivation and time spent studying also contribute greatly to student achievement. In reviewing the literature on predictors of MBA GPA, Koys (2005) concluded that “when the GMAT was studied in conjunction with other predictors, it was always the strongest predictor.”

Work Experience

The work experience of the applicant to an MBA program has also been widely used as an admission criterion. Indeed, most business schools use 2 or more years of work experience as a screening criteria, such that applicants are automatically rejected if they have not accumulated the requisite years of work experience. This is reinforced by the requirements of accrediting bodies that require 2 or 3 years business experience as the minimum for accreditation. Work experience refers to full-time employment in a business or organization, although most schools will accept as equivalent a sufficiently long period of part-time work experience. Some MBA programs ask for “business experience” in the apparent belief that working in a business will instill greater understanding of the business context and thus provide a better platform on which to base MBA education. Other programs, particularly executive (EMBA) programs, require 5 or more years of “management experience,” which takes the prior learning and business experience of candidates to a higher plane.

Entering MBA students typically want to be assured that they will be surrounded by classmates who have a minimal level of understanding about

business and management, and they want to avoid having to endure disingenuous questions in class and dealing with inexperienced classmates in their work groups. Work experience is believed to reflect enhanced human capital, since one learns by doing and by making mistakes. Work experience also provides each student with one or more work contexts from which they can make sense of the new material being introduced in MBA programs. Work experience is also effectively a proxy for the maturity of the individual, and may cause individuals to be more realistic about their capabilities and expectations. Indeed, Julie Cisek Jones, a program director at Northwestern's top-ranked EMBA program, places considerable importance on work history in selecting students for their EMBA program (Gloeckler, 2005).

Although there have been some studies that have found a significant positive relationship between work experience and MBA GPA (e.g., McClure, Wells, & Bowerman, 1986) many have failed to find a significant, positive relationship (e.g., Dugan, Grady, Payn, Baydar, & Johnson, 1996; Graham, 1991; Kaiser, 1978; Pitcher, 1972). Despite finding that work experience did significantly predict first-semester grades, Dreher and Ryan (2000) pointed out that this accounted for only a small proportion of the variance and that they had failed to find a significant relationship between work experience and performance for subsequent courses. From their own empirical studies (Dreher & Ryan, 2000, 2002) and a review of others' empirical tests, Dreher and Ryan (2004) concluded that "the literature on the relationship between work experience and academic achievement was limited in scope and, on balance, failed to support the work experience requirement."

We note that Mintzberg (2004) is scathing in his critique of minimal (2–3 years) work experience as a sufficient base for management and leadership education, asserting that much more than that is needed to allow MBA students to adequately put into context the material that is covered in MBA programs.

Admissions Criteria and an Entrepreneurial Mind-Set

Although there are a myriad of factors believed to be important to explaining success as a manager, mind-sets to work effort required, independence and risk have all been shown to be criteria that individuals use in selecting jobs (e.g., Caird, 1991; Hull, Bosley, & Udell, 1980; Stewart & Roth, 2001) and represent part of an entrepreneurial mind-set (Douglas & Shepherd, 2000, 2002; Ireland et al., 2003).

Ireland and colleagues (2003) proposed that success in a management career in the 21st century economy will require an *entrepreneurial mind-set* to enhance firm performance while competing in turbulent and unpredictable environments—turbulent and unpredictable environments like those of emerging economies (Appiah-Adu, 1998; Luo, 2007). For example, "in the past 15 years, India's identity has undergone one of the biggest transformations that any country has ever experienced" and Indian businesses find themselves at the center of the global economy (Friedman, 2006: 76). Thailand is another Asian emerging economy that is turbulent and unpredictable and particularly vulnerable to events like the Asian Financial Crisis (Paulson & Townsend, 2004).

An entrepreneurial mind-set requires managers to take decisive action based on considered responses to the situation at hand. Considerable effort is required by managers to overcome organizational inertia and build strategic flexibility into their organizations, including developing the firm's human capital, updating manufacturing and information technologies, and implementing new organization structures and culture (Hitt, Keats, & De Marie, 1998). Effort represents the force, energy or activity by which work is accomplished (Brown & Peterson, 1994: 71) and it is widely recognized that effort "above and beyond the call of duty for the benefit of the organization" (Mowday, Porter, & Steers, 1982: 15), is associated with high individual performance, customer satisfaction, repeat business, and ultimately corporate competitiveness (Barlett & Ghoshal, 1994; Kuczmariski & Kuczmariski, 1995; Reade, 2003).

In particular, organizational structures need to be relatively flat to facilitate coordination, collaboration, and strategic flexibility, and this requires its managers to prefer to be relatively autonomous decision makers (Hitt et al., 1998). Indeed, autonomous actions are imperative to strategic adaptation (Andersen, 2000; Burgelman, 1988; Noda & Bower, 1996). Managers need to be able to respond to problems speedily (Eisenhardt & Martin, 2000; Shimizu & Hitt, 2004). Although waiting for more information to accumulate would reduce the risk associated with the pursuit of a potential opportunity, failure to act decisively is likely to result in the loss of potential first-mover advantages (Lieberman & Montgomery, 1988). Indeed, and especially when the environment is hypercompetitive, highly dynamic, or high velocity (Brown & Eisenhardt, 1998) managers must be willing to accept the risk inherent with introducing new products, services, and business processes. Market volatility, including the potential absence of a market

thought to be waiting for a new product or service, will cause income volatility, and managers must be willing to accept such unexpected variations in the income of their firms, not to mention the consequences for personal income, which depends at least in part on bonuses and capital gains associated with stock held in the firm.

Individuals with greater work experience have had greater opportunity to recognize these key aspects of a mind-set for managerial success and begin to develop them. For example, greater levels of work experience provide greater exposure to successful managers who act as role models; they have had more time to experience (personally or vicariously) which managerial mind-set is most effective and to develop it. Thus,

Hypothesis 1: Indian and Thai students of "Western" style MBAs with more work experience have mind-sets to work that are (a) less averse to hard work, (b) more independence seeking, and (c) less averse to personal risk than those with less work experience.

As Daft (1979: 48) noted, "Admission criteria are designed to identify and admit students who will succeed academically in an MBA program and screen out students who will not perform well. . . . A more difficult question concerns identification of student characteristics that may be related to success in a management career." To the extent that a GMAT score reflects a student's cognitive ability (at least at the tasks associated with the MBA program), it likely also provides some insight into the student's motivational attitudes. Perhaps students with higher GMAT scores perceive themselves as special, belonging to an elite group of intelligentsia, and as such, should not be expected to work as hard as others.

There is some empirical support for a negative relationship between cognitive ability and work-related motivation. For example, Boudreau et al. (2001) found a negative relationship between conscientiousness and cognitive ability, where conscientiousness refers to individuals that are hard working, persevering, organized, and achievement oriented (McCrae & Costa, 1987) and cognitive ability was operationalized by SAT score (a standardized admission test for undergraduate programs). More generally, Colarelli, Dean, and Konstans (1987) found that cognitive ability had a negative relationship with both internal work motivation and organizational commitment. The greater the internal work motivation (Ryan & Deci, 2001) and organizational commitment (Green, Welsh, & Drehler, 2003; Schmidt & Calantone, 2002) the less

averse an individual is expected to be to working hard.

Furthermore, this notion of a negative relationship between cognitive ability and internal motivation likely has implications for a mind-set toward independence. It appears that individuals who look to work as a source of intrinsic motivation seek greater independence. For example, autonomy is a key antecedent to intrinsic motivation (Ryan & Deci, 2001), where autonomy at work has been associated with freedom to decide when, where, and how the job is to be done (Thompson & Prottas, 2006). To the extent that individuals with higher GMAT scores have lower internal work motivation (Boudreau et al., 2001; Colarelli et al., 1987), we expect those with higher GMAT scores to be less intrinsically motivated to pursue careers that offer greater independence.

A high GMAT score represents a signal of potential performance in the MBA program (Gayle & Jones, 1973; Wright & Palmer, 1994). Students with high GMAT scores and good performance in early classes can develop a reputation as someone with a lot of "intellectual horsepower," reflecting their appeal to key constituents such as other students, career counselors, and potential employers. This reputation represents a valuable asset worth protecting; reputation is protected by reducing the overall riskiness of future investments by taking a "safer" route (cf., Diamond, 1989). Over and above reputation, students with high GMAT scores and good performance in early classes can benefit from high status, that is, a high social rank amongst the student body. This high social rank represents a valuable asset that can be maintained by associating with other high status individuals or organizations. High status actors tend to avoid projects of high uncertainty (Podolny, 2001) for fear that they might be investing their career in a wrong opportunity—one that could create a negative association undermining status (cf., Washington & Zajac, 2005). Thus,

Hypothesis 2: Indian and Thai students of "Western" style MBAs with higher GMAT scores have mind-sets to work that are (a) more averse to hard work, (b) less independence seeking, and (c) more averse to personal risk than those with lower GMAT scores.

RESEARCH METHOD

Sample and Context

The sample for this experiment was 205 graduate students from a relatively new business school in

India and 78 graduate students from a top-ranked business school in Thailand, both of which offer an American-style MBA program that is taught largely by visiting professors from U.S. business schools. The Indian program is the outcome of a joint venture between Indian business interests (who funded the establishment of the business school) and several prestigious U.S. business schools (who provide their faculty to teach into the MBA program). The Indian sample was the entire MBA class in the middle of their program in late 2003. The great majority of the students were Indian citizens, with several more of Indian ethnicity from the United States, Singapore, or elsewhere. All these students were highly IT- and Internet savvy, seemingly well-versed in global business, and accustomed to U.S.-based case studies.

The Thai MBA program is the result of a joint venture agreement between two top U.S. business schools and Thailand's premier university, and has been offering the MBA for over 20 years. More than one third of the Thai students had previously gained their first (bachelor's) degree from overseas, most of these from the United States and a few from Britain or Australia. As with the Indian sample, these students were typically well aware of international issues, routinely study U.S.-based cases in their classes, and were highly aware of the latest information technology developments. The Thai sample was collected in two parts: one group ($n = 38$) from an MBA cohort in 2004 and a follow-up sample ($n = 40$) from a later MBA cohort in 2006. There were no significant differences in responses across groups ($p > .05$).

For both schools, students are selected on the basis of the typical U.S. admissions requirements (as indicated earlier) including the GMAT score and work experience. Indeed, Koys (2005) found the GMAT to be valid for non-U.S. students, indicating a global convergence of knowledge that underlies business aptitude. Nonetheless, care must be taken in generalizing from this sample to other MBA students, or to Indian or Thai citizens more generally. In any case these are important samples in their own right, given the status of India and Thailand as emerging economies in Asia and as potential major players in the global economy.

Conjoint Analysis

We used a conjoint experiment to collect data on the mind-sets of MBA students. The basic assumption behind conjoint analysis is that decisions of individuals can be decomposed into their underlying structures (Green, Krieger, & Wind, 2001). Deci-

sion makers are required to make assessments of hypothetical decision profiles, which are described by a number of attributes representing the research variables. This form of conjoint analysis ("metric conjoint analysis") is well established in research on strategic decision making of managers (Priem, 1992; Priem & Harrison, 1994). Scholars have also applied conjoint analysis in other areas, such as marketing and psychology (Green & Srinivasan, 1990). Conjoint analysis is the appropriate method for our research on mind-sets for two primary reasons.

First, conjoint analysis allows researchers to collect real-time data on decisions of individuals and this allows us to capture mind-sets by students' real-time evaluative judgments. This is in contrast to retrospective methods, such as questionnaires, surveys, and interviews, which potentially suffer biases and errors due to the inaccurate introspection of participants (Fischhoff, 1982). Second, scholars have shown that conjoint analysis is useful for studying how individuals assess career-related alternatives. For example, conjoint analysis has been used to study students' decision policies for selecting among MBA programs (Huang, 2005), choice of course electives (McGoldrick & Schuhmann, 2002) and among career alternatives (Douglas & Shepherd, 2002). In our research, we also analyze students' career decision policies to ascertain their mind-sets toward work-related attributes and then investigate variation in these mind-sets across individuals by testing the explanatory ability of GMAT and work experience. Finally, the mind-sets being tested have been conceptually (Douglas & Shepherd, 2000) and empirically (with a sample of Australian students; Douglas & Shepherd, 2002) linked to entrepreneurial intentions. Kim and Hunter's (1993) meta-analysis demonstrates a positive link between intentions and behaviors.

Besides the advantages described above, we would like to note that conjoint analysis also has some limitations. Some argue that these "paper-and-pencil" experiments do not reflect real-world decisions and may lack external validity. However, several studies including those by Brown (1972) and Hammond and Adelman (1976) have shown that the decisions individuals make in conjoint studies are similar to their real-world decisions. We have minimized issues related to a lack of external validity for this conjoint experiment by using a sample of individuals likely to be considering career options in the near future, by using decision criteria that are theoretically justified in a number of decision-making studies, and by using

profiles that have face validity with career decision makers (cf., Brehmer, 1988).

Decision Situation and Research Variables

In the conjoint experiment, participants are first provided with a description of the decision situation. Subsequently, they are presented with the decision profiles representing hypothetical careers. The attributes constituting the profiles are described by two different predetermined levels (high and low). In analysis at the level of the decision, these attributes constitute the independent variables, whereas students' assessments of each hypothetical career constitute the dependent variable. This analysis leads to the mind-set of the sample as a whole, that is, the mind-set of the sample to work effort required, independence, and risk. There is likely variability across individuals in their mind-sets. Our level 2 analysis is at the level of the individual and is designed to explain variance in the mind-sets across individuals. In this analysis, an aspect of the mind-set is the dependent variable and GMAT and work experience are the independent variables.

Description of the Decision Situation

We described the nature of the task to students as "since you may be involved in making a career decision in the near future, you are ideally qualified to make judgments about the attractiveness of career opportunities. In this study you will be asked to answer a few simple questions and then evaluate a series of hypothetical offers. When making these assessments, assume you have savings that are equal to one year's salary." They were then instructed that they "will be presented a number of "hypothetical" career opportunities. For each career opportunity (described in terms of Independence, Work Effort, Risk, Ownership, and Income) consider" the attractiveness of each career being presented. The instructions specified that all conditions, other than the attributes described in the profile, are to be considered constant across all profiles. This controlled for possibly confounding attributes.

Decision Assessment. We asked students to assess the attractiveness of each career alternative on a 7-point Likert scale anchored by *very low attractiveness* ("1") to *very high attractiveness* ("7").

Career Attributes. Profiles in our conjoint experiment consist of five attributes. As previous metric conjoint studies have done (Priem & Harrison, 1994; e.g., Shepherd 1999), we represent each attribute by two levels. Three of these attributes describe the

career and are central in determining students' mind-sets toward these attributes—work effort, independence, and risk—and two describe the career and were used as control variables.

Work effort is defined as hours of work multiplied by intensity of effort applied. Levels presented were high (requires a high number of hours per week and maximal personal exertion) to low (requires a low number of hours per week and minimal personal exertion). *Independence* is defined in terms of decision-making autonomy. Levels presented were high (you would be responsible for most decisions and not be highly constrained by the policies of others) to low (you would be responsible for very few decisions and be highly constrained by the policies of others). *Risk* is defined as the variation in the income level expected. Levels presented were high (income is highly variable—it could be very high or it could be very low) to low (income is highly stable—it is unlikely to change much from what is expected). Attribute and level definitions are consistent with Douglas and Shepherd (2000, 2002).

Attributes as Control Variables

Income is defined as total income received from the career option. Levels presented were high (total income is substantially above average for people your age, education, and experience) to low (total income is substantially below average for people your age, education, and experience). *Ownership* is defined as percentage ownership in the firm. Levels presented were self-employed (you own the majority, say 60%, of the firm) to employed (you own 0% of the firm).

Experimental Design

Because a fully crossed factorial design for this study would require 32 (i.e., 2⁵) profiles, an orthogonal fractional factorial design was used to reduce the number of attribute combinations to 16 and thus make the decision-making task more manageable (Green & Srinivasan, 1990). In choosing an orthogonal fractional factorial design from Hahn and Shapiro (1966), we followed the general rule of confounding effects of most interest with effects that are unlikely to be significant or, if they are significant, are unlikely to cause much bias in the parameters that are estimated (Louiervie, 1988). Each of the original 16 profiles was then fully replicated. We randomly assigned profiles within the original and replicated halves of the experiment and the order of attributes within a profile for four versions of the experiment to test for order effects.

There was no significant difference across versions ($p < .05$), and therefore, order effects are unlikely to have influenced the results. A practice profile was used at the start of the experiment to familiarize respondents with the experiment but was not used in the analysis.

Postexperiment Questionnaire

Independent Variables for Level 2 Analysis

While the conjoint experiment collected data at the level of the decision (level 1), the postexperiment questionnaire collected data at the level of the individual (level 2). As described above, analysis of the data from the conjoint study provides the decision policies of individuals reflecting their mind-sets to work effort required, independence, and risk as well as for income and ownership. The individual level variables of the GMAT score and work experience will be used to explain variance in these mind-sets. All respondents had recently taken the GMAT and they were asked to report that score and their years of work experience.

Control Variables for Other Forms of Human Capital

The general human capital variables used as control variables are consistent with other human capital studies, and included age (Bates, 1995; Rees & Shah, 1986); level of highest education (Reynolds, 1997; Storey, 1994); education specialty (Dimov & Shepherd, 2005); and entrepreneurial experience (Davidsson & Honig, 2003). We also included personal income prior to beginning the program. An individual's prior income provides an indication of the market valuation of their human capital. These control variables are included because it can be hypothesized that mind-sets might vary according to them. For example, we might expect age and years of education to be positively associated with a favorable mind-set toward independence, as the older and better educated people are, the more they become accustomed to making decisions and the more they probably prefer to be in charge (e.g., Proenca & Shewchuk, 1998).

For highest level of education, respondents chose from the categories of high school, bachelor's, master's, and PhD from which years of schooling was calculated; for total business experience, respondents were asked in total, how many years work experience (full-time equivalent) they had accumulated; and for educational specialty respondents chose from the categories of business, engineering, science, humanities/arts, which were

TABLE 1
Descriptive Statistics for the Sample

	<i>M</i> or %	<i>SD</i>
Age	27.961	4.759
Amount of Education	Bachelor's	na
Business Education	35.6%	na
Science Education	11.8%	na
Engineering Education	38.1%	na
GMAT	650.30	81.92
Previous Income	10,000–19,999	na
Work Experience	5.37	4.12
Recently Self-Employed	12.9%	na
Self-Efficacy	3.827	.486

dummy coded. For recent self-employment experience, respondents were asked if immediately prior to starting their MBA they had been self-employed. Those with such experience were dummy coded 1 and those who did not were dummy coded 0. Respondents were asked to record their most-recent income on an 8-point scale starting at \$10,000 US or less and increasing by \$9,999 for each point, ending at \$70,000 or more (respondents were keenly aware of the exchange rate).

Self-Efficacy

Self-efficacy is a measure of a person's internal belief that they can successfully complete a specific task (Bandura, 1982). Chen, Greene, and Crick (1998) developed and tested a scale for entrepreneurial self-efficacy which is appropriate here, since the tasks specified all relate to managing an entrepreneurial business.

ANALYSIS AND RESULTS

Table 1 details descriptive statistics of the sample. Respondents were on average relatively young (almost 28 years); all with at least a bachelor's degree (38.1% in engineering, 35.6% in business, and 11.8% in science); with average GMAT score of 689; the mode for previous income was between \$10,000–19,000 US, with 5.37 years prior work experience, and were predominantly employed prior to entering the program (87.1%). Their self-efficacy score on Chen et al.'s (1998) 5-point scale averaged 3.83.

Reliability and Validity of the Captured Mind-Set

First, the test-retest reliability of the conjoint experiment was high. Regression analysis used to decompose each individual's decisions into his or her individual mind-set provided an indication of the explanatory ability of the model. Each one

TABLE 2
Results for Hierarchical Linear Model of Career Desirability Attitudes and MBA Selection Criteria
(GMAT and Work Experience)

	Intercept		Attitudes to Work Effort		Attitudes to Independence		Attitudes to Risk	
	Coef.	t ratio	Coef.	t ratio	Coef.	t ratio	Coef.	t ratio
Work experience	-.016	-1.145	-.018	-1.576	.014	.949	.013	1.103
GMAT	0	-1.129	-.001	-2.624***	0	.015	-.001	-2.554**
Intercept	3.752	134***	-.075	-2.142**	1.174	30.346***	-.480	-13.408***
Self-efficacy	.010	.133	.081	.888	.094	1.052	.100	1.406
Education								
Business	.006	.062	.257	2.733***	-.102	-.830	.004	.039
Science	-.138	-1.153	.337	2.519**	.112	.703	.151	1.147
Engineering	.152	1.753*	.202	2.153**	.088	.693	.139	1.411
Prev. Income	.032	2.040**	-.005	-.248	-.011	-.553	.002	.120
Country	-.145	-1.370*	.391	3.717***	.489	4.843***	.205	2.11**

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.10$.

$n = 9056$ decisions nested in 283 students.

(100%) of the individual models explained a significant proportion of variance in career decisions ($p < .05$) with a mean R^2 of .811. Further, Pearson R correlations were computed between each participant's assessment of both the original and the 16 replicated profiles in a test-retest of reliability. All but two of the respondents were significantly reliable in their responses ($p < .05$). The mean test-retest correlation for the sample was .899. This test-retest correlation is high relative to Shepherd's (1999) test-retest reliability of .69 and provides assurance that the conjoint task was performed consistently by the respondents.

Second, to provide empirical evidence that these attitudes were part of an entrepreneurial mind-set, we tested the link between the generated mind-sets and entrepreneurial career choices—for the future in the form of entrepreneurial intentions as well as for previous career decisions. For entrepreneurial intentions, students responded to the following question: "How likely is it that you would want to be self-employed within two years after graduation, assuming you had a good new business opportunity and could raise the funding necessary to start your own business?" They answered on a 7-point scale from *very unlikely* to *very likely*. We found that individuals' entrepreneurial intentions explain variance in mind-sets—a significant relationship between entrepreneurial intentions and attitudes to independence (coefficient .059; $p < .05$), a significant relationship between entrepreneurial intentions and attitudes to risk (coefficient .044; $p < .05$), and a marginally significant relationship between entrepreneurial intentions and attitudes to work effort required (coefficient .032; $p <$

.01). Although intentions do not always lead to behavior, there is a well-established positive association between the two (Kim & Hunter, 1993). Students were also asked whether they had previously been self-employed. We found that attitudes to risk were positively associated with students' past career choices to be self-employed (coefficient = .314; $p < .01$). These two tests provide some evidence that the mind-sets generated from the conjoint study are positively related to the preference for careers that are more entrepreneurial in nature. Finally, the results reported in the section that follows are robust across the Indian and Thai subsamples.

Explaining Heterogeneity in Mind-Set: The GMAT and Work Experience

Although the experiment provides 32 observations per respondent, and therefore, 9056 observations for the sample as a whole, there may be autocorrelation because each batch of 32 observations is nested within an individual. Hierarchical linear modelling (HLM) is ideally suited for analyzing nested data and accounts for variance among individuals such that the observations within an individual are independent. We use HLM to determine the significance of the desirability mind-sets in explaining career decisions and whether the GMAT score and work experience explain variance in individuals' desirability mind-sets, while holding constant other human capital variables and self-efficacy. These results are reported in Table 2.

Column 1 of Table 2 lists the variable labels: the GMAT, work experience, human capital variables

(education and prior income), self-efficacy, and the intercept. Columns 2 and 3 detail the coefficients and *t* ratios, respectively, of the model intercept. This intercept reflects the ability of the variables listed in column 1 to explain individual differences in career decision attractiveness over and above career attributes (i.e., work effort required, independence, risk, income, and ownership). Columns 4 and 5 detail the coefficients and *t* ratios, respectively, to reflect the ability of the variables listed in column 1 to explain differences between students' mind-sets toward career *work effort required* in their decision policies. Columns 6 and 7 are for the mind-sets toward *independence* in their decision policies, and columns 8 and 9 for the mind-sets toward *risk* in their decision policies.

Hypothesis 1 stated that MBA students with more work experience would have mind-sets that are (a) less averse to hard work, (b) more independence seeking, and (c) less averse to personal risk than those with less work experience. However, work experience did not significantly explain variance in mind-sets to work effort, independence, or risk, and therefore, does not support Hypotheses 1a, 1b, or 1c, respectively.

Hypothesis 2 stated that MBA students with higher GMAT scores would have mind-sets to work that are (a) more averse to hard work, (b) less independence seeking, and (c) more averse to personal risk than those with lower GMAT scores. We find that GMAT explains variance in the sample's mind-set to work effort required (coefficient $-.001$; $p < .01$) and risk (coefficient $-.001$; $p < .01$). The negative coefficient for work effort required means that those with higher GMAT scores were more averse to work effort in their mind-sets than those with lower GMAT scores. This finding provides support for Hypothesis 2a. The negative coefficient for risk means that those with higher GMAT scores were more risk averse in their mind-sets than those with lower GMAT scores. This finding provides support for Hypothesis 2c. The coefficient for GMAT on independence (coefficient 0.00 ; $p < .10$) was not significant and therefore does not provide support for Hypothesis 2b.

DISCUSSION AND CONCLUSION

A long line of authors have criticized the MBA program as a training ground for managers and business leaders (Ghoshal, 2005; Mintzberg, 2004; Pfeffer & Fong, 2002). Many have also questioned whether some combination of prior GPA, GMAT score and work experience is the best selection criteria in terms of predicting success in business careers. Here, we demonstrate that basing admission decisions on the

GMAT score may be filling MBA programs with candidates who have the cognitive ability to do well in the MBA program but may not have the most desirable mind-sets for management and leadership in a dynamic and global economy. Mintzberg (2004: 90) asserts that many MBA candidates "don't have the will for it," and our results lend some support to his assertion by showing that mind-sets of working hard and taking risks are negatively related to GMAT scores. Mintzberg (2004) also highlights the fact that many of the entrepreneurial heroes of our time (such as the founders of Dell Computer, and Google) do not have MBAs and that some successful national economies (such as Japan and Germany) have relatively few MBAs.

Is management success therefore not dependent on an MBA education? Indeed we acknowledge the value of learning by doing, of self-paced learning, and of mentoring and counseling. But surely a good MBA program will turn a potentially good manager into a potentially better manager. The thirst for MBA graduates by corporations, and the derived demand for MBA programs by individuals, attests to the fact that an MBA program adds value to individuals and organizations. The question we are asking is whether our MBA programs are adding value to the "right" individuals, or is there a systematic bias being exercised that leads to the admission of some candidates who will not benefit society as much as those who are not admitted (due to lower GMAT scores) might?

Based on our findings, it appears that the GMAT score selects students that have mind-sets toward their management careers (at least during their MBA program) that are more averse to work effort and to risk. To the extent that this impacts the attitudinal makeup of business schools' graduates there are a number of potentially detrimental implications for the organizations that employ them. The tasks involved in managing an organization in the 21st century economy require considerable managerial effort. Managers need to build strategic flexibility and overcome organizational inertia. This can be achieved by managerial effort focused on continuously developing the firm's human capital, updating manufacturing and information technology, and implementing new organization structures and cultures (Hitt et al., 1998). This type of "hustle" is needed to enhance corporate competitiveness (Bartlett & Ghoshal, 1994), especially in today's hypercompetitive and dynamic business environments in the emerging markets of India and Thailand. Based on our findings, we suspect that this aspect of the entrepreneurial mind-set is in short supply among our graduates of top MBA

programs in India and Thailand, and more so for those with higher GMAT scores.

Our findings also suggest a negative relationship between GMAT scores and mind-sets toward taking risks—more specifically, attitudes toward high variance alternatives. There is an antifailure bias among managers (and professors) that encourages firms to pursue incremental opportunities rather than high variance opportunities, which makes failure more likely and more costly (McGrath, 1999). Mean performance of firms is enhanced by the pursuit of high variance opportunities through a process of hypothesis testing (Hayek, 1945). This positive relationship between the pursuit of high variance opportunities and mean performance applies to projects within organizations and firms within national economies (McGrath, 1999). We hypothesized that Indian and Thai students with higher GMAT scores were less likely to pursue career opportunities with high variance.

We did not find a significant relationship between work experience and attitudes that contribute to an entrepreneurial mind-set believed necessary to be a successful manager. Not finding a significant relationship between work experience and an outcome measure of MBA students is consistent with Dreher and Ryan's (2004) conclusion that the literature on the relationship between work experience and academic achievement, on balance, has failed to support the work experience requirement for admission into an MBA program. Although consistent with this conclusion, care must be taken in making inferences from nonfindings. First, findings of nonsignificance could be the result of research methods limitations—an inability to detect an existing relationship. Potential limitations of the current study are discussed in the next subsection. Second, work experience in this study, other studies, and in admission selection, is captured by the length of the work experience, and not so much the nature of the work experience. Therefore some individuals' work experiences could have reinforced attitudes that are consistent with an entrepreneurial mind-set (e.g., a high-tech firm experiencing high growth in a dynamic industry), while others might have experiences in firms that reinforce a more trustee mind-set (Brown, Davidsson, & Wiklund, 2001; Stevenson & Jarillo, 1990) such as with an accounting or law firm. Considering the nature of students' work experiences is likely to provide greater insight into their managerial mind-sets.

Limitations

This study has a number of limitations. Likely criticisms of metric conjoint analyses were addressed

earlier. Like most studies on the effectiveness of MBA admission criteria, specifically the GMAT and work experience, our sample was made up of current MBA students. This creates two limitations. First, we cannot rule out the possibility that students' mind-sets have changed during the MBA program. Therefore, it could be the interaction of the GMAT score and learning in the MBA program that explains variance in their managerial mind-sets. Although using a sample of students allows our results to be more comparable to other published studies and that the relationship between mind-sets and entrepreneurial intentions was consistent with others findings for graduates of a bachelor's degree (a sample closer in character to a pool of MBA applicants), future researchers need to assess the extent to which our study (and most other studies) faces a survivor bias. Second, and as a consequence of the previous limitation, our sample is likely to have a more restricted range than the pool of applicants to these MBA programs. The range of GMAT scores for this study was larger than for most studies, which use samples of students in U.S.-based MBA programs. Nevertheless, restriction of range remains an issue for this study.

There may also be questions about the generalizability of our results arising from a sample of Indian and Thai MBA students. Our results are consistent with a study on attitudes and entrepreneurial intentions that used a sample of alumni from a bachelor's degree program (undergraduate degree) of an Australian University (Douglas & Shepherd, 2002). Alumni of a bachelor's program are the very students that are likely to apply to an MBA program. We also collected data on GPA from a subsample of Thai students (29 students). Consistent with other studies we found a positive relationship between GMAT and GPA (correlation = .319; $p < .10$) but a nonsignificant finding for work experience (correlation = $-.215$; $p > .10$). These findings suggest that the relationship between mind-sets and entrepreneurial intentions and the relationship between GMAT and GPA for our sample and subsample are consistent with findings for other samples in published studies.

Future Research

Our purpose was to explain the relationship between current selection criteria and the mind-sets of MBA students. Offering prescriptions about specific changes to MBA selection procedures is premature. However, we do suggest that business schools need to acknowledge that the mind-sets of its graduates will help explain their managerial intentions and behaviors, and therefore, selection

criteria that capture students' mind-sets will be informative in complementing the GMAT and work experience in creating an attitudinally diverse student body suited for a range of different career possibilities including managing entrepreneurial organizations. Future researchers need to further develop and refine measures to capture these mind-sets. This future research could take a number of potential paths to which we now turn.

First, mind-sets are often represented as attitudes, and attitudes are often measured by revealed preferences (Mellers, Schwartz, & Cooke, 1998). For example, scholars have investigated individuals' preferred gambles to ascertain their attitudes to risk (e.g., Kahneman & Lovallo, 1993; Thaler, Tversky, Kahneman, & Schwartz, 1997). However, explicit measures of real-time attitudes create a number of challenges, including social desirability, which is likely strong for applicants desiring to be accepted by a preferred business school (Fazio & Olson, 2003). However, attitudes can be assessed by past education and career decisions. This represents a more fine-grained analysis of applicants' academic record and work experience, respectively. To what extent do these revealed preferences in the subjects that a student has chosen and the career choices they have made indicate a more "positive" attitude toward hard work (less work averse), independence (more independence seeking) and risk taking (less risk averse)?

Second, attitudes can be measured by revealed preferences toward hypothetical future career alternatives. Conjoint analysis, as used in this study, has been used to reveal attitudes toward different MBA programs (Huang, 2005), attitudes toward course electives (McGoldrick & Schuhmann, 2002), and attitudes among career alternatives (Douglas & Shepherd, 2002). The challenge with using conjoint analysis for selection into an MBA program is that it takes approximately 30 minutes to complete and requires considerable data inputting. However, recent advancements in on-line software for conjoint studies could speed the process for students and researchers.

Third, a survey instrument could be developed to capture an applicant's attitudes. Such instruments exist for an individual responding about his or her firm's strategic orientation (Entrepreneurial Orientation scale; Covin & Slevin, 1989) and the firm's preferred mode of management practice (entrepreneurial versus trustee; Brown, Davidsson, & Wiklund, 2001; Stevenson & Jarillo, 1990). Future research could adapt these firm-level measures to capture an individual's attitudes toward more entrepreneurial management practices. Such a measure would need to be conscious to not suggest a socially desirable answer.

Current firm-level measures have been able to avoid the social desirability issues.

Fourth, validate and then use established instruments for capturing the cognitive or affective antecedents to attitudes. One such possibility as an antecedent for the cognitive dimension is *cognitive style*—the characteristic way people process and organize information and arrive at judgments (Brigham, DeCastro, & Shepherd, 2007; Riding & Rayner, 1998). These judgments are revealed preferences that indicate an individual's attitudes. Although there are a number of different measures of cognitive style, a commonly used measure is the Cognitive Style Index (CSI; Allinson & Hayes, 1996). With CSI, individuals are represented on a continuum from *intuitivists*—individuals who tend to be relatively nonconformist, prefer an open-ended approach to problem solving, rely on random methods of exploration, and work best with ideas requiring a broad perspective—to *analysts*—individuals who tend to be more compliant, favor a structured approach to problem solving, prefer systematic methods of investigation, and are especially comfortable with ideas requiring sequential analysis (Allinson & Hayes, 1996; Brigham et al., 2007). Of interest is that Brigham and colleagues (2007) found intuitivists showed a greater preference for entrepreneurial tasks than did analysts, yet Armstrong (2000) found that analysts received higher overall grades in a business degree than did intuitivists. It appears that CSI might be an important component of a more comprehensive assessment of applicants' likely attitudes to different management tasks, specifically, those required for managing a business in the 21st century.

Finally, a limitation of this study is that we were unable to investigate the extent of the match between graduates' mind-sets and the nature of their postgraduation career tasks to empirically explain variation in managerial performance. We believe that this represents an important opportunity for future research.

Conclusion

We investigated the assessments of career attractiveness by 283 MBA students from India and Thailand, to reveal the extent to which they had mind-sets that are associated with those believed necessary to be a successful manager in today's economy. We found that an existing selection criterion for MBA admission—the GMAT—was negatively associated with the mind-set believed to be necessary for managerial success. That is, the fast-moving global economy requires managers to have an entrepreneurial mind-set, yet we find that

MBA students with higher GMAT scores have mind-sets that are more averse to work effort and to risk, and therefore, may discriminate against applicants with a greater propensity to behave entrepreneurially. Our findings suggest the need to consider (potential) students' mind-sets toward management to complement existing selection criteria. We believe that there is more work to be done in developing such measures but, once validated, these measures will assist business schools in selecting a pool of students that can go on to be successful managers.

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