Working Smarter and Harder: A Longitudinal Study of Managerial Success

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We measure the effects of motivation and ability on the early career success of a sample of Master's of Business Administration (MBA) graduates in the early years of their careers. We argue that performance is a joint effect of two important individual characteristics: general cognitive ability and motivation. General cognitive ability, which is representative of the general population, refers to individual differences in tasks or pursuits that demand mental effort, such as abstraction, rule inference, generalization, and manipulating or transforming problems. Motivation is conceptualized as a stable mental state that energizes human behavior. Results show that the combination of high general cognitive ability and motivation is significantly associated with more early career success. MBAs who were both smarter and worked harder were more successful in their job search upon graduation, were earning higher salaries, had more rapid pay increases, and received more promotions in their early careers. These findings add to the mounting evidence that studying enduring individual characteristics is critical to predicting behavior.

In the past several years, organizational researchers have engaged in a rather artificial debate about the extent to which individual differences or dispositions predict job outcomes such as attitudes and behaviors (e.g., Davis-Blake and Pfeffer, 1989). While the debate is provocative, a careful examination indicates that there may be less substance to this debate than it seems. By now, most organizational researchers acknowledge the fundamental importance of situational effects, the existence of stable individual differences, and their interaction as causes of behavior (Wright and Mischel, 1987; Chatman, 1989). The controversy lies in questions about the usefulness of measuring dispositions that are sometimes poorly specified and lack reliability and validity, the absence of well-developed theoretical justifications for constructs for given situations, and the frequent use of cross-sectional research designs that do not permit adequate longitudinal testing of clearly specified hypotheses (e.g., Weiss and Adler, 1984).

It is clear that poorly designed studies of dispositions exist, but some stable individual differences may predict important attitudes and behavior. Intelligence, or general cognitive ability (GCA), has a long, well-documented history of research that reliably predicts important organizational outcomes such as job performance and career success (e.g., House, Howard, and Walker, 1992). Hunter (1986: 340) reported a review of "hundreds of studies showing that general cognitive ability predicts job performance in all jobs." The predictive ability of GCA increases for jobs or situations that require increased information processing. This is consistent with Wright and Mischel's (1987) competency-demand hypothesis, which implies that people with more general cognitive ability are likely to perform better in cognitively demanding situations. General cognitive ability predicts performance across jobs, settings, and careers (Gottfredson, 1986; Dreher and Bretz, 1991; Schmidt, Ones, and Hunter, 1992).

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Personality researchers have largely ceased to be concerned with the idea of a pure trait or dispositional approach, however, and widely agree that behavior is a function of both individual and situational factors. Kenrick and Funder (1988: 31) reviewed the person-situation debate and concluded that "As with most controversies, the truth finally appears to lie not in the vivid black or white of either extreme, but somewhere in the less striking gray area." Situations may affect people, while people may affect situations and maintain distinctive personal styles across situations (Schneider, 1987).

There are several problems here for organizational researchers. First, intelligence or general cognitive ability is a construct that most organizational scholars have not investigated. Instead of building on the massive evidence for the efficiency of GCA as a predictor of job-related outcomes, researchers have pursued other, less well-defined dispositional constructs (Gerhardt, 1987). This has led some experts to raise the obvious question, "If the predominance of the *g* [general cognitive ability] factor has been apparent to many if not most psychologists ever since mental tests were invented, why should so much time, energy, and creativity have been invested in the attempt to identify and measure more limited abilities?" (Tyler, 1986: 446).

Second, some of the earliest models of human performance (e.g., Heider, 1958) suggested an interactional approach, using ability and motivation, of the type called for in recent articles (e.g., Chatman, 1989). Campbell (1976: 64), observed that in industrial and organizational psychology, performance is a function of the interaction between ability and motivation. Pinder (1984), in his review of the motivation literature, made a similar observation and noted that it may be that high levels of one component compensate for low levels of the other. This general approach is the basis for expectancy models of motivation that conceptualize performance as the interaction between ability and effort. Motivation is a person's willingness to expend effort and persist at an activity, while ability is a person's capacity to perform certain tasks. Motivation and ability are both necessary, but neither alone may be sufficient for high levels of performance. A highly motivated person may lack critical abilities for success, while a person with ability may lack the motivation to succeed.

More recent research has refined both of these constructs. Ability, at its most global level, can be thought of as general cognitive ability or the underlying general mental abilities that are expressed in the differential performance of individuals on a class of tasks that require cognitive information processing (e.g., Carroll, 1992). This general cognitive ability, or "*g*," is common to all types of cognitive processing, such as verbal, spatial, numerical, reasoning, and musical performance and appears to be based on underlying neural processes. Motivation has often been characterized as a stable, general trait, labelled "conscientiousness," that varies across individuals (Goldberg, 1993) and reflects attributes such as dependability, attention to detail, carefulness, and responsibility. People who are highly conscientious are

hardworking, persevering, organized, and achievement oriented (McCrae and Costa, 1987).

Given the evidence for the importance of general cognitive ability and motivation as stable individual differences and predictors of performance in organizations (e.g., Hunter, 1986; Barrick and Mount, 1991; Carroll, 1992) and the long tradition in industrial psychology of conceptualizing performance as the interaction of motivation and ability (e.g., Ackerman and Humphreys, 1990), it is surprising that there is so little empirical research testing this parsimonious and intuitively appealing proposition. The purpose of this study is to test the interaction of conscientiousness and general cognitive ability as predictors of early career success among a cohort of recent Master's of Business Administration (MBA) graduates.

General Cognitive Ability and Job Performance

In 1986 the *Journal of Vocational Behavior* devoted an issue to a controversial topic: the "*g*" factor in employment, "*g*" referring to general mental or cognitive ability as characterized by Spearman (1927). In this issue, a number of eminent psychologists addressed a question that has been largely absent from the industrial psychological literature for the past two decades: What is the association between intelligence and job performance? Several factors make this issue both important and provocative. First, up through the 1950s, the use of intelligence or general cognitive ability tests was common in employment. Harrell (1992), for instance, reported that the military used a general mental ability test to classify over 12 million people. During the next decade, they fell out of favor, due to criticisms that these tests were discriminatory and invalid (Cronbach, 1975). Ironically, as Hunter (1986) and Gottfredson (1986) showed, there are hundreds of empirical studies showing that general cognitive ability (GCA) predicts performance for a wide variety of jobs. It appears that psychologists shifted their attention away from the construct of GCA for reasons other than its conceptual importance and empirical ability to predict performance.

Some argued forcefully that intelligence and aptitude tests could not predict occupational success or other important life outcomes but that "competencies" might (e.g., McClelland, 1973). But as Barrett and Depinet (1991: 1021) demonstrated, after a careful review of both the empirical evidence and the criticisms of the construct, ". . . McClelland and his associates have not yet been able to produce any professionally acceptable empirical evidence that their concept of competencies is related to occupational success." And Gottfredson (1986: 330) concluded that " '*g*' emerges as the single most useful worker attribute for predicting job performance, as a valid predictor in all types of jobs, and is an especially valid predictor of performance in more complex and higher level jobs."

The evidence linking GCA and job performance is impressive. Ree and Earles (1991a) studied over 78,000 air force enlistees across 82 jobs and concluded that a measure of general intelligence (*g*) was the best predictor of success in job training, and measures of specific abilities were not

needed to increase predictive power. Nathan and Alexander (1988) showed that GCA validly predicts outcomes such as supervisory ratings and rankings, work samples, and production quality and quantity. Campbell (1990), summarizing a $25 million army study, also reported that core job performance was best predicted by general cognitive ability, with other predictors adding only small increments in validity. In a longitudinal study of over 13,000 high school graduates, Austin and Hanisch (1990: 83) found that after 11 years elapsed, general cognitive ability "appears to be an overriding force in determining the upper endpoint of an individual's choice of occupation. . . ." These and other studies (e.g., Howard, 1986; Schmidt, Hunter, and Outerbridge, 1986) repeatedly demonstrated the importance of GCA in predicting job performance and occupational attainment.

In examining how GCA might produce these effects, Schmidt and his colleagues (Hunter, 1986; Schmidt et al., 1988) demonstrated that higher levels of GCA enabled job incumbents to acquire important job knowledge. This increased knowledge, in turn, leads to improved performance. And, while job experience may also lead to increased job knowledge and performance, because GCA effects are independent, experience cannot compensate for GCA (Schmidt et al., 1988). When people have the same work experience, GCA differences become a critical element in determining individual differences in performance. Schmidt and Hunter (1992: 92) concluded that "the central determining variables in job performance may be general mental ability, job experience (i.e., opportunity to learn), and a broad trait of conscientiousness." These characteristics can lead to large and economically significant improvements in output.

GCA becomes an even more critical determinant of performance when the job demands are themselves more complex. Schmidt and Hunter (1992: 92), reported that "On a typical lower level job (i.e., an unskilled job), a worker at the 85th percentile in performance produces about 20% more than the average worker. . . . For professional and managerial jobs, it is about 48%." When Arvey (1986) arrayed jobs along a general cognitive ability dimension, he found that higher-level jobs, such as those held by managers, required increased cognitive abilities, including the ability to recall job-related information, identify situations quickly, and adapt and rapidly learn new procedures. Over time, this may lead to more rapid mastery of jobs and higher rates of career advancement, manifest in more promotions and higher salary levels (Rosenbaum, 1979; Howard, 1986). Thus, a large body of evidence suggests the potential importance of GCA as a predictor of job performance in general and, insofar as management jobs require complex information processing, managerial success in particular.

General cognitive ability: The construct. The general notion that people might vary in intelligence or general cognitive ability was first formally proposed by Sir Francis Galton. Spearman (1927) refined the concept by specifying that intelligence comprises two kinds of mental abilities: a general ability (referred to as *g*) and specific mental abilities

(referred to as *s*). General ability (*g*) is required for the performance of virtually all higher-level tasks involving complex information processing. Specific abilities (*s*) are required for the performance of specific single tasks. This theory has led to 70 years of empirical research examining both the differential aspects of mental abilities across individuals and, more recently, research into the information processing associated with variations in mental abilities (Sternberg, 1979).

But what is "*g*"? A sample of individuals will vary in how well they do on any task or pursuit that makes demands on mental effort. When results of a number of tests, all of which require cognitive ability, are aggregated, some common underlying differences in performance will emerge. The source of this variance is referred to as *g,* the general factor underlying individual differences in performance. As such, *g* cannot be described in terms of a particular type of test content, knowledge, or skill, and no actual test measures it exclusively. The most *g*-loaded tests, such as IQ tests, involve relatively complex information processing, such as abstraction, rule inference, generalization, and manipulating or transforming the content of the test item (Jensen, 1992b). In this sense, *g* is common to all tests of cognitive performance, such as tests of verbal, numerical, and spatial abilities. Studies have shown *g* to be the primary source of predictive validity for almost all cognitive tests. When the variance associated with *g* is statistically removed from tests of specific cognitive abilities, the predictive validity of the test scores is typically reduced to almost zero (Jensen, 1992a).

Because *g* is so general, it is difficult to describe in terms of a test's formal characteristics or in terms of any particular information content or skills required by specific items (Seligman, 1992); *g* is not specific to particular skills or knowledge. It is general in that it is relevant and representative of the general population. It is cognitive in that individual differences in sensory acuity or physical strength or dexterity contribute negligibly to variance in it. And it is an ability in that it refers to conscious and voluntary acts that meet some objective standard. These acts are also consciously repeatable.

While *g* is common to every type of cognitive performance, it would be a mistake to think of it as merely some kind of psychometric artifact or hypothetical construct without meaning or reality beyond the scores obtained on a test. Aside from the evidence for its strong predictive validity in job performance and occupational success (Gottfredson, 1986; Hunter, 1986; Schmidt, Ones, and Hunter, 1992), studies have shown *g* to be a highly replicable and stable construct (Gustafson, 1984; Krantzler and Jensen, 1991; Ree and Earles, 1991b). Recently, *g* has also been reliably linked to how people apprehend, discriminate, select, encode, transform, and store information and use this information to make decisions. Studies have shown that *g* is related to reaction time on elementary cognitive tasks, capacity of short-term memory, evoked potentials, glucose metabolism in the brain, and speed of neural transmission

(Vernon, 1987; Larson and Saccuzzo, 1989; Jensen, 1992b). There is a growing consensus that *g* reflects the overall capacity and efficiency of human information processing and is definitively not a measure of a particular kind of knowledge, skill, or test-taking strategy (Fagan, 1992). The content of performance on a general cognitive test is merely a vehicle for *g*. As Jensen (1992a: 277) observed, "As the most important factor in tests of mental ability in terms of its ubiquity and relative size among all of the factors in psychometric tests, its correlations with neuropsychiatrical variables, and with the efficiency of information processing in elementary cognitive tasks, and its relation to educationally, occupationally, and socially important criteria, the empirical reality of *g* is hardly disputable."

Criticisms of general cognitive ability. But criticisms of *g* remain endemic. Although the empirical evidence linking *g* to job performance is widespread, this has not convinced the skeptics (e.g., Sternberg and Wagner, 1993). Three criticisms are often raised: (1) associations between GCA and outcomes are an artifact of the association between intelligence and social origin or socioeconomic status (SES); (2) more specific aptitudes targeted at particular tasks or jobs will be better predictors of performance than general cognitive ability; and (3) measures of GCA are fundamentally biased.

Each of these criticisms reflects a concern that the findings linking GCA and performance are either spurious or disadvantageous to some groups, but investigation of these concerns typically fails to find that the biases are important. For instance, the concern that GCA-performance associations stem from differences in social origins, not veridical individual differences, is predicated on the notion that the true cause of performance comes from social advantages indexed by variables such as parents' income, education, and occupation, family structure, or region of residence, essentially that GCA is actually a function of SES. The evidence for this claim, however, is weak (e.g., Valliant, 1977; Bouchard et al., 1990). Barrett and Depinet (1991: 1018) reviewed this literature and concluded that "The relationship between IQ and job success is not an artifact of SES." Similarly, the argument that GCA, as a global construct, is too broad in scope and that more specific abilities may be better predictors of performance is not empirically supported (e.g., Campbell, 1990; Schmidt, Ones, and Hunter, 1992). Hunter (1986: 358) concluded, "A massive data base gathered by the U.S. Employment Service and even more data gathered by the U.S. Military have shown the specific aptitude hypothesis to be false." Finally, concerns about a possible cultural bias in measures of GCA have also been alleviated when tests are carefully validated and interpreted (e.g., Wightman and Leary, 1985; Hecht and Schraeder, 1986; Schmidt, Ones, and Hunter, 1992). While the full extent of this debate is beyond the scope of this paper, the preponderance of evidence suggests that GCA-performance links are not spurious or biased (Seligman, 1992). Based on the discussion thus far, we therefore hypothesize:

Hypothesis 1: Higher levels of general cognitive ability will be positively associated with career success (e.g., salary level, promotions).

The Importance of Motivation for Job Performance

Thus far we have argued that GCA may be an important predictor of job performance, but it is obviously not the only one. As noted previously, a number of early conceptualizations of work performance posited that both ability and motivation would jointly contribute to performance. While there is general consensus that the construct of motivation includes components of direction, amplitude, and persistence, there is much less agreement on how to measure these elements. While Campbell (1976: 64), observed that performance should reflect both motivation and ability, he defined motivation only broadly: ''Motivation does have meaning if we take it merely as a summary label that identifies a class of independent/dependent variable relationships.'' When motivation isn't clearly defined, the notion that performance reflects ability and motivation begs the question of what the measure of motivation might be. This has led to numerous theoretical and empirical approaches, some emphasizing exogenous or state motivation, in which reinforcements are used to shape behavior situationally, and others focusing on endogenous or trait motivation and examining internal process (e.g., Pinder, 1984). The basic idea that motivation, whether exogenously or endogenously determined, should be linked to work performance has nevertheless been well documented (e.g., Locke and Latham, 1990), although the findings are often not as strong as expected (O'Reilly, 1991). The simple notion that those who work harder or expend more effort should, all other things being equal, perform better is generally accepted. Therefore, it is important to consider relevant motivational characteristics to understand job performance and early career success fully.

Recent research in personality shows that a trait (defined as a stable predisposition to behave in characteristic ways) labelled ''conscientiousness'' may represent stable individual differences in motivation (Goldberg, 1993). Importantly, conscientiousness is related to job performance (e.g., Barrick and Mount, 1991, 1993). Adjectives that characterize conscientiousness include being hardworking, careful, dependable, organized, ambitious, energetic, and persevering (McCrae and Costa, 1987; John, 1990). McCrae and Costa (1987) argued that conscientiousness represents both a will to achieve, as suggested in the classic definition of the need for achievement (McClelland et al., 1976), and the discipline and energy level that can sustain the hard work necessary for performance. At the other end of the spectrum, those who are low on conscientiousness can be characterized as undirected and lazy.

Psychological research has shown that conscientiousness correlates positively with academic achievement (Digman and Takemoto-Chock, 1981). In the organizational domain, conscientious employees are careful, dependable, organized, hardworking, and thorough. Barrick and Mount (1993), who investigated the relationships between conscientiousness and managerial success in a sample of 154 managers, found

modest but statistically significant associations between conscientiousness and supervisory ratings of performance. The effects of conscientiousness were moderated by job autonomy, a situational effect. Managers who had more autonomy and who were more conscientious performed the best. Schmidt and Hunter (1992: 91) speculated that "conscientiousness may come to be viewed as the most important trait motivation variable in the work domain." Independent of state motivation—motives induced by incentives, goal setting, or other programs—people who are highly conscientious are likely to perform better:

Hypothesis 2: Higher levels of motivation will be positively associated with career success.

Performance = Ability × Motivation

The contributions of GCA and motivation to performance suggest an interaction effect of the type proposed by early industrial psychologists (Campbell, 1976). Each component by itself may not strongly predict performance and, ultimately, career attainment (Kanfer and Ackerman, 1989). A person with very high levels of cognitive ability who is highly unmotivated may find creative ways to be lazy and thus not perform well. Similarly, an industrious person with very low cognitive abilities may persistently demonstrate his or her ineptitude on the job, removing all doubt as to his or her poor performance. Dreher and Bretz (1991) noted that cognitive ability should account for variation in performance only when motivation is considered. Variability in motivation across individuals may dampen associations between ability and performance. Thus studies attempting to link graduate admission test scores to future compensation often report nonsignificant and sometimes negative relationships, leading to the conclusion that motivation may be an unmeasured moderator of ability (Harrell et al., 1977; Reder, 1978). Similarly, studies of motivation often fail to find strong associations with performance, leading researchers to acknowledge that ability and other situational constraints may attenuate these relationships (Barrick and Mount, 1991, 1993). These findings suggest that Heider's (1958) original multiplicative formulation may be correct.

Some indirect support for this is provided by Anderson and Butzin (1974: 598), who showed that observers use judgments of both motivation and ability in estimating the performance of others. Although they did not specifically demonstrate that both motivation and ability lead to performance, their study did show that people use this multiplicative algebra when estimating the performance of others. Other studies have also provided some modest evidence for a multiplicative association between motivation and ability in affecting outcomes (Hollenbeck et al., 1988). While there have been numerous studies of motivation, however, there has been little consideration of the interaction of motivation and ability. Hence, while both GCA and motivation may have independent effects on performance, the strongest effect and the one we hypothesized is that it is the interaction of GCA and motivation that will positively predict job performance:

Hypothesis 3: The interaction of general cognitive ability and motivation will be positively associated with career success.

METHODS

Research Design and Sample

Data for this study were collected during two time periods—first, in 1986 and 1987 (with samples from both years), when respondents were enrolled in their first year of a two-year, full-time, top-20, West-Coast MBA program, and again in 1991, three and a half or four and a half years after graduating, depending on which of the two years they initially participated in the study. All first-year MBAs were informed, through announcements in their classes, of the opportunity to participate in a weekend personality and managerial assessment center. Because space was not available for all the students who signed up, participants were chosen to make the sample as representative as possible of their entire MBA cohort attending this university. In general, the sample closely resembled the larger MBA cohorts (approximately 240 in each), except that fewer foreign students participated (11 percent versus an average of 15 percent of the 1986 and 1987 cohorts), and slightly more women participated (43 percent versus an average of 34 percent across the 1986 and 1987 cohorts). Most importantly, the average GMAT scores across the two years was 630, which is quite similar to the mean of 626 in our sample.

Data collection in the first period (Time 1) was done through a personality and management assessment center. The primary objective was to gather data about participants' motivation level. Participants were assessed, in groups of twelve, over a weekend from Friday night through Sunday afternoon. Eleven separate weekend assessments were conducted. The focus of the second data collection period, the follow-up, during the Fall of 1991 was to gather data about participants' early career status and work outcomes, three and a half or four and a half years following graduation from the MBA program. Personality, ability and motivation data were not collected again. Of the original 132 participants, 105 (80 percent) were successfully contacted for the 1991 follow-up. Of these 105 participants, 11 were either not employed or were employed part time and were excluded from this study. The response rate for the follow-up was, therefore, 71 percent (94 respondents).

Measures

General cognitive ability. Although there are differences of opinion about how to measure general cognitive ability, there is reasonable consensus that it can be measured by summing across tests of several specific aptitudes, usually verbal and quantitative. These are typically not achievement tests; they measure general knowledge rather than narrow academic curricula or technical domains. General cognitive ability tests are composed of general items, all of which are weakly correlated. A measure of general aptitude, like verbal aptitude, is developed by combining a large number of similar items. The evidence for such factor structures is impressive (e.g., Jensen, 1986; Carroll, 1992), and while some criticisms of these stable, global measures exist, critics often fail to appreciate how powerful they are at predicting general tendencies (Green, 1978; Jensen, 1986).

One frequently used measure of general cognitive ability is the Graduate Management Admissions Test (GMAT) (e.g., Hecht and Schraeder, 1986). Although the agency that develops the test does not label the GMAT as a test of intelligence, it fits the general requisites of a measure of general cognitive ability. GMAT scores were therefore used as markers of individuals' cognitive ability in this study. Respondents' GMAT scores were coded from their original graduate application materials, and most had taken the test at least ten months prior to enrolling in the MBA program. Thus, the measure of GCA used here was collected at least six or seven years prior to the outcome variables. The GMAT total score has been defined so that it ranges from 200 to 800, with an approximate mean of 500 and a standard deviation of 100. Reliability coefficients for equivalent forms exceed .90. The mean for all test takers from June 1982 through March 1985 was 478 (Hecht and Schraeder, 1986). In this sample, GMAT total scores ranged from 480 to 750 (x = 626, S.D. = 58). As with most top-20 business schools, the study site has rigorous GMAT-score requirements for admission. A floor effect may thus constrain the possible variation in GMAT scores in this sample, making this a conservative test of the proposition and the results most generalizable to similar professionals.

Motivation. Although many definitions of motivation exist, most emphasize three common characteristics: direction, amplitude and persistence (e.g., Pinder, 1984). While some studies examined motivation as a transient state using projective tests or job-focused surveys (e.g., Miner, 1980), recent research suggests that motivation, defined as conscientiousness, can be assessed as a stable characteristic using personality inventories. According to the five-factor model of personality, five broad dimensions, "the Big Five," can be used to describe most individual differences: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (e.g., McCrae and Costa, 1987; Goldberg, 1993). Of these, conscientiousness represents persistence or follow-through and is associated with job performance and other indicators of career success (e.g., Barrick and Mount, 1991, 1993). Conscientiousness has been assessed with selected scales from the Adjective Check List (ACL) (Gough and Heilbrun, 1980). Using factor analysis, Piedmont, McCrae, and Costa (1991) found that three ACL scales, achievement, endurance, and order, loaded most highly on the conscientiousness factor and correlated most highly with the conscientiousness factor on the NEO personality inventory, designed specifically to tap the Big Five (Costa and McCrae, 1985). These three measures of order, achievement, and endurance correspond to the motivational components of direction, amplitude, and persistence, and the measure of conscientiousness is thus conceptually similar to the general notion of motivation.

Motivation was assessed in this study by having participants complete the Adjective Check List during the assessment (Time 1). The ACL is a self-report personality inventory consisting of 300 items that fall into 37 scales. The respondent checks each item that applies to him or her and leaves blank each item that does not apply. Each scale is

corrected for total endorsements to prevent artifacts that may result from subjects who merely check few or many items (e.g., Gough and Heilbrun, 1980). The three scales that are relevant to motivation (achievement, endurance, and order) consist of 77 items. Positively coded items include ambitious, energetic, industrious, initiative, reliable, and responsible; while negatively coded items include apathetic, careless, lazy, leisurely, and undependable. The mean of the three scales was used to represent participants' motivation level in this study ($x = 51.63$, S.D. $= 7.94$). The interitem reliability of the composite motivation measure was .85.

While some researchers argue that self-report personality data may be subject to enhancement biases not present in observer data (e.g., John and Robins, 1994), others offer convincing arguments that self-judgments are more accurate because they include relevant and valid information not available to observers (e.g., Funder, 1989). Alternatively, some argue that differences between self- and observer ratings are due to a harshness bias by observers rather than an enhancement bias by focal individuals (Coyne and Gotlib, 1983). To check for bias, we correlated participants' self-ratings with ACL ratings by 12 trained personality assessors. These assessors observed participants continually over the course of the two-and-a-half-day assessment center's activities, which included exercises (e.g., the Leaderless Group Discussion, charades), interviews, and informal social events such as meals. At the end of the weekend assessments, the 12 assessors independently completed the ACL for each of the twelve participants (this procedure was only completed for 47 percent of our sample). These observer data were aggregated across observers and averaged across the three scales (achievement, endurance, order). The average alpha coefficient across the 12 raters for this observer's measure of motivation was .92. The correlation between the self-reported motivation measure and the observer's measure of motivation for the portion of the sample for which it was available was high ($r = .42$; $p < .001$).

A measure designed specifically to tap conscientiousness is the Big Five Index (BFI) (John and Roberts, 1993). Although we did not collect BFI measures on the subjects in our study, we do have BFI and ACL measures for another sample of 70 MBA students, assessed under similar conditions in 1991–93. Therefore we were able to correlate the BFI conscientiousness scale with our ACL composite scale for these other MBAs. The correlation between the two scales was quite high (.79; $p < .001$) providing some evidence of concurrent validity of the ACL measure of motivation for MBAs.

Early career success. Previous research has suggested that career success is multidimensional (e.g., Pfeffer, 1977). Early career success may be signalled as early as the initial interview process or through salary attainment or the rate of promotion (Rosenbaum, 1979; Dreher, Dougherty, and Whitely, 1985). While different researchers have examined various facets of career success, there appears to be general agreement that both promotions and salary attainment are important elements (e.g., Forbes and Piercy, 1991). Since

GCA is an aggregate measure and career success is multidimensional, this study uses five indicators to assess early career success: selection success, number of job offers, current salary, salary increment, and number of promotions.

(1) *Selection ratio* and (2) *number of offers.* Respondents reported the total number of interviews they completed and the total number of offers they received during their initial job search. To ensure accurate recall, these questions were included on a brief questionnaire distributed during the spring following their graduation. Selection ratios were calculated as the number of offers divided by the number of initial interviews (x = .25, S.D. = .24). The number of offers was simply the number of job offers respondents reported receiving (x = 2.44, S.D. = 1.33).

(3) *Current salary* and (4) *salary increment.* As part of the 1991 follow-up survey, respondents were asked to list the compensation for all jobs they had held since graduating from the MBA program. Salary increment was calculated as their current salary divided by the salary they received from their first job after business school. One respondent, an investment banker, reported that his current salary was $450,000, which was far above the mean salary for all other respondents. In order to avoid biasing the results with this extreme outlier, data from this respondent were dropped from all analyses. Current salary for the remaining 93 respondents was simply the amount respondents reported earning in the fall of 1991 (x = $63,050, S.D. = $27,215). Salary increment was x = 1.37, or an average 37 percent increase (S.D. = .40).

(5) *Number of promotions.* On the follow-up survey, respondents also indicated which of their positions, following their initial job, represented a promotion. The total number of promotions was calculated by adding together all reported promotions (x = 1.03, S.D. = .83).

Additional measures. We assessed motivation and predicted career success using three additional measures. The first was a single-item, self-reported measure of *ambition.* Respondents were asked to rate themselves on a scale from 1 (extremely low) to 9 (extremely high) according to the extent to which "[They] have high aspirations for future attainments and status; strong drive for success." Ambition scores ranged from 5 to 9 (x = 7.44, S.D. = 1.05).

The second measure was a consensus rating made by three managerial assessors of each respondent's *initiative,* defined as "[having] aptitude in initiating action, is energetic." Like the personality assessors described above, for each group of 12 participants, there were six managerial assessors, each of whom provided assessments of six participants per weekend assessment. In contrast to the personality assessors, managerial assessors confined their assessments to direct observations of participants' behaviors in one of three contexts: (1) the verbal responses in an in-depth work and professional history interview, in which participants were asked about their parents' employment, their own job history, and their future career aspirations; (2) the written responses on an individual in-basket exercise in which

participants acted as a plant manager (see Staw and Barsade, 1993); and (3) demonstrated behavior in a Leaderless Group Discussion (LGD), in which participants had to negotiate with five other participants to allocate bonuses to each participant's hypothetical subordinate. At the end of all three assessment activities, managerial assessors met in groups of three (depending on the six participants they were assigned to), and each assessor presented his or her comments on the specific assessment exercise or task that he or she focused on (e.g., each assessor was randomly assigned to focus on either the LGD, in-basket, or interview for each subject; for example, assessor A focused on the LGD for participant 1 and 4, the in-basket for participant 2 and 5, and the interview for participant 3 and 6). After all information was presented on each participant, each assessor independently rated each of the six participants on each of 15 dimensions (e.g., initiative, energy, oral communication). Then the assessment teams reached consensus on the ratings for each participant by choosing the modal score of the three ratings for each of 15 managerial dimensions. According to standard procedures used in assessment center ratings (e.g., Zedeck, 1986), if any of the managerial assessor ratings differed by more than 1 point (on a 5-point scale), the assessors reexamined and rediscussed all the information about that participant until they reached consensus. The initiative scores ranged from 1 to 5 (x = 3.45, S.D. = .97).

The third measure was respondents' self-reported number of hours they *would like* to work per week after graduation (*desired hours*). Subjects were asked this question as part of a take-home packet of materials that were filled out a few days before the weekend assessment began. Responses ranged from 30 to 60 hours (x = 43.13, S.D. = 6.50).

Control variables. A number of control variables were included in the regression analyses in order to rule out alternative explanations for variations in career success, since recent MBA graduates' success may be due to factors other than general cognitive ability and motivation. For instance, research has shown that gender and age may affect employment opportunities within and across organizations (Pfeffer and Langton, 1988). In addition, past work experience and the level and caliber of education may affect one's career success (Howard, 1986). Further, the specific career path one chooses may affect career outcomes (Pfeffer, 1977). For example, investment bankers are trained at a relatively low salary for the first year or two of their employment, and then their income jumps dramatically and maintains a higher level than most other MBA functional areas (e.g., cost accountant, financial analyst). Following an entrepreneurial path and running one's own business may lead to differences in career outcomes as well. Finally, national origin may also affect early career success, since countries may differ in terms of typical career paths and indicators of career success (e.g., Hofstede, 1984).

Therefore, gender (43 percent female), age (x = 27.7) and citizenship (non-U.S. = 11 percent) were controlled in all equations. Further, while the initial data were collected at

the same time in each respondent's MBA program, the follow-up data were collected at the same time for all respondents. This meant that the 1987 cohort had been working for a year less than the 1986 cohort at the time of the follow-up. Therefore, a dummy variable for the year the respondent graduated was also entered in all equations as a control. To address the possible idiosyncratic salary patterns generated by the investment banking and entrepreneurial paths, a dummy variable for each was entered in all equations. Race (24 percent minority, 76 percent white), college major, undergraduate grade-point average, years of previous work experience (x = 3.4 years), and a dummy variable created to differentiate between those who chose a career in the public/nonprofit domain (6 percent of the sample) were initially included as controls but were subsequently dropped due to their lack of significance in affecting the career success variables.

RESULTS

Predicting Career Success

Table 1 presents the means, standard deviations, and correlations among the variables. The five dependent variables are reasonably independent, with the highest correlation existing between the number of job offers received and the selection ratio (r = .38, $p < .05$). Bivariate relationships show that investment bankers were younger and entrepreneurs were generally older, while women and foreign citizens were more likely to follow entrepreneurial career paths. General cognitive ability and motivation appear to be independent (r = .03, n.s.): People with higher general cognitive ability are not likely to be more or less motivated than people with lower general cognitive ability.

To examine the effects of GCA, motivation, and their interaction on managerial success, we used hierarchical regression analyses. Consistent with our conceptual discussion, we entered the control variable block first, followed by the GMAT score, the motivation score, and finally by the interaction between GMAT and motivation. Thus, when each subsequent independent variable was entered, that variable's partial correlation reflected its relationship with career success, independent of the effects of all previous control and independent variables (Cohen and Cohen, 1983: 122). Table 2 displays the regression results.

Selection. The equation predicting the selection ratio (offers/interviews) shows a positive effect for entrepreneurs but no significant effects for either cognitive ability or motivation or for their interaction. Investment bankers received significantly more offers, as shown in the equation predicting the absolute number of offers. Again, while no significant main effects for either GCA or motivation emerge, the interaction term significantly predicts the number of offers participants received, and in the expected positive direction. High scorers on the GMAT who were also highly motivated received significantly more job offers (β = 7.64, $p < .05$). Overall, neither GCA nor motivation by itself strongly predicts success in getting a job; only the interaction of the two is linked to success in the job-search process.

Table 1

Means, Standard Deviations and Correlations Among Variables*

Variable	*x*	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
Control variables														
1. Age	27.6	4.47	–											
2. Sex			−.14	–										
1 = female	41.9%													
2 = male	58.1%													
3. Year graduated			−.07	.04	–									
0 = 1987	44.1%													
1 = 1988	55.9%													
4. Citizenship			−.09	.23	−.11	–								
0 = U.S.	89.2%													
1 = non-U.S.	10.8%													
5. Investment banker			−.21	−.03	−.01	−.13	–							
0 = no	88.2%													
1 = yes	11.8%													
6. Entrepreneur			.23	.14	.06	.19	−.10	–						
0 = no	93.5%													
1 = yes	6.5%													
Cognitive ability														
7. GMAT total	626.2	58.2	.19	−.01	.01	−.18	−.05	−.01	–					
Motivation														
8. ACL composite	51.63	7.94	.10	.05	−.01	−.11	−.13	.15	.03	–				
Career success														
9. Number offers	2.40	1.30	.02	−.04	.04	−.15	.25	−.02	−.02	.05	–			
10. Offers/interviews	.25	.24	.07	−.02	−.13	.05	−.13	.31	−.17	.17	.38	–		
11. Current salary ($)	63K	27K	−.05	−.02	−.17	−.11	.62	−.04	.07	.04	.23	.08	–	
12. Salary increment	1.42	.40	−.17	−.03	−.21	.02	.25	.05	−.26	−.03	.14	.34	.34	–
13. Promotions	1.03	.83	−.07	−.11	−.15	−.20	−.19	−.09	−.15	.01	−.04	.13	.01	.33

* $p < .05$ for correlations greater than .20.

Table 2

Hierarchical Regressions Predicting Early Career Success*

	Offers/interviews	Number offers	Current salary	Salary increment	Promotions
1. Control variables					
Age	−.04	−.01	.07	−.18	−.17
Sex	−.06	.05	.01	−.06	−.08
Year graduated	−.13	.01	−.14	−.23	−.19
Non-U.S. citizen	.01	−.12	−.04	−.01	−.25
Investment banker	−.11	.23	.59•	.22	−.26•
Entrepreneur	.24	−.04	.01	.14	−.01
Change in R^2	.09	.08	.36	.14	.15
Adjusted R^2	.01	.01	.31	.07	.05
Change in *F*-ratio	.94	.96	6.75•	1.86	1.54
2. GMAT total	−.17	−.03	.08	−.23	−.19
Change in R^2	.03	.01	.01	.05	.03
Adjusted R^2	.01	.01	.30	.10	.07
Change in *F*-ratio	1.86	.04	.72	3.85•	2.05
3. ACL motivation	.14	.02	.11	−.01	−.04
Change in R^2	.02	.01	.01	.01	.01
Adjusted R^2	.01	.01	.31	.09	.05
Change in *F*-ratio	1.18	.02	1.29	.01	.09
4. Interaction	−.12	7.64•	4.54•	3.08	6.12•
Change in R^2	.01	.25	.09	.04	.16
Adjusted R^2	.01	.24	.40	.12	.23
Change in *F*-ratio	.01	23.49•	11.50•	3.39•	12.32•
Full equation *F*-ratio	.96	3.46•	6.71•	2.13•	2.91•

• $p < .05$.
* Entries represent standardized coefficients.

Salary. Investment bankers had significantly higher current salaries. Although main effects for GCA and motivation were not significant, significant variance in salary is explained by the interaction between GMAT and motivation. Together with the investment-banker dummy variable, the current salary equation explains a sizable 40 percent of the variance in MBAs' fall 1991 salaries (overall $F = 6.71$, $p < .05$). The equation predicting MBAs' salary increment is significant as well. As expected, those who graduated earlier experienced greater increases in their salary, with investment bankers showing slightly higher increases over the duration of the study. The only main effect for GMAT or motivation emerged in the prediction of salary increment. In contrast to expectations, GMAT scores are significant, but they are negatively related to salary increment ($\beta = -.23$, $p < .05$). But again, a major contribution to explained variance resides in the interaction between GMAT and motivation. Those who *both* had high GMAT scores and who were more motivated (change in $R^2 = 4$ percent, overall $F = 2.13$, $p < .05$) experienced greater salary increases in the early years of their careers. Both overall and incremental salary are predicted by the interaction between motivation and ability.

Promotions. U.S. citizens and investment bankers were more likely to receive promotions, but significant main effects for cognitive ability and motivation did not emerge. The interaction between cognitive ability and motivation significantly predicted variance in the number of promotions respondents received (change in $R^2 = .16$, overall $F = 2.91$, $p < .05$). The results thus offer no support for either hypothesis 1 or hypothesis 2 but do provide strong support for hypothesis 3: The overall pattern of the regression results suggests that both motivation and GCA are necessary to explain early career success.

Additional Analyses

Race. One control variable that was not reported in the regression results presented in Table 2 that may be related to GCA is race. To ensure that the results were not biased by race, we re-estimated all regression equations twice: one analysis including a dummy variable that distinguished between whites and nonwhites (76.3 percent versus 23.7 percent), and a second set that used a dummy variable that distinguished between whites and Asians in one group and all other people of color in another group (85.0 percent versus 15.0 percent). Neither of these dummy variables significantly affected the career success variables. Further, only the race variable separating whites and nonwhites affected the overall amount of variance explained (adjusted R^2). Therefore, we can conclude that race failed to exert a consistent or pervasive effect on the dependent variables.

Artifacts. Because of our relatively small sample size and the paucity of main effects for GCA and motivation, the possibility exists that our interaction effects may stem from a few extreme sample points. To check for this, we examined scattergrams for each of the five interaction equations. These plots showed no salient outliers. The extremes of the plots were, in all instances, defined by a set of observations rather than a single or few data points.

Further, there were no significant gaps in the plots between interactions and the dependent variables. Taken together, these observations rule out the likelihood of artifacts causing the interaction results.

Further evidence of the interaction of motivation and ability. The additional three measures of motivation collected at time 1 (ambition, initiative, and desired hours) were each substituted for the ACL motivation measure in separate hierarchal regressions, structured identically to those described above. The pattern of results was, again, generally supportive of our prediction that the interaction between GCA and each of these measures of motivation would account for more variance in the career success outcomes than would either GCA or motivation alone. Of the 15 equations (each of five dependent variables regressed on the three motivation variables), 10 of the interaction terms were positive and significantly associated with the career success variables. Further, the interaction between GCA and motivation always explained more variance in career success than either variable alone. The amount of variance explained (adjusted R^2) by the full equation for the 10 significant equations ranged from .11 (GMAT and self-reported ambition predicting number of offers) to .53 (GMAT and self-reported ambition predicting current salary). Taken together, these results strengthen the evidence for our initial prediction, because the three motivation variables are conceptually diverse (e.g., ambition and initiative capture general personality, while desired hours captures specific behavior) and methodologically diverse (e.g., ambition and desired hours are self-reported, while initiative was generated by a consensus rating by trained observers).

We also ran the regression analyses substituting observer ratings for self-reported ACL scores. The pattern of results was comparable, although weaker than those reported above. This was clearly due, in part, to the smaller sample.

Understanding the interaction results. One issue that is not clarified by the regression analyses is whether greater levels of both motivation and general cognitive ability are always better or whether there is some point at which having greater motivation produces diminishing returns for those with high cognitive ability. Therefore, in addition to examining the regression coefficients for the interactions, we also analyzed their functional form. Graphing a partial derivative, or inflection point, can reveal nonmonotonic effects that are not apparent in the tabled coefficients (Schoonhoven, 1981: 362). Such analyses clarify the interpretation of interaction results. To plot the interactions, we assumed that the cognitive ability variable modified the effects of the motivation variables on career success. Research suggests that one's motivation level is more likely to change over time than is one's general cognitive ability (Carroll, 1992).

Following Schoonhoven (1981), we analyzed the interactions by calculating the inflection point of the interaction to determine whether the function was monotonic or nonmonotonic. All five inflection points were well below the relevant range in GMAT scores for this sample, allowing us

to conclude that the interactions are monotonic. This means that any increase in motivation at increased levels of cognitive ability leads to an increase in career success.

To specify more concretely what this means in terms of the career success variables, we calculated the contribution of increases in motivation at two levels of GMAT scores—relatively low for this sample (one standard deviation below the mean GMAT score, or 568) and relatively high (one standard deviation above the mean, or 684.4), using the following equation (Schoonhoven, 1981):

$$y = b_1x_1 + b_3x_1x_2 ,$$

where b_1 = the unstandardized coefficient for motivation, x_1 = the mean motivation score (51.63), or one standard deviation above the mean (59.57), b_3 = the unstandardized coefficient for the GMAT and motivation interaction, and x_2 = the low (568) or high (684.4) score on the GMAT.

For the interaction between GMAT and motivation predicting the number of job offers received, a one standard deviation increase in motivation increased the number of offers by .93 more when the person had a high GMAT score. To understand this result, it helps to consider the difference between a one standard deviation increase in motivation when GMAT is high versus when it is low. At low levels of GMAT (568) the difference between a mean motivation score (51.63) and one standard deviation above the mean (59.57) can be compared with the same one standard deviation increase in motivation at a high GMAT score level (684.4):

Low GMAT Level:	High GMAT Level:
.01(51.63) + .001 (51.63)(568) = 29.84	.01(51.63) + .001 (51.63)(684.4) = 35.85
.01(59.57) + .001 (59.57)(568) = 34.43	.01(59.57) + .001 (59.57)(684.4) = 41.37

The important number is the difference between these two differences: (41.37 − 35.85) − (34.43 − 29.84) = 5.52 − 4.59 = .93, which represents the increase in the number of offers for a standard deviation increase in motivation for higher scorers on the GMAT relative to those with lower GMAT scores. Using the same logic, a standard deviation increase in motivation at higher GMAT levels (684.4) is worth $18,780.08 more in compensation than a standard deviation increase in motivation at lower GMAT levels (568). A standard deviation increase in motivation at high levels of GMAT is associated with a 1.85 percent greater salary increment compared with a standard deviation increase in motivation at low levels of GMAT. Finally, a standard deviation increase in motivation at high levels of GMAT is associated with .56 more promotions, compared with a standard deviation increase in motivation at low levels of GMAT.

DISCUSSION

The overall results of the study show that it is the interaction of motivation and general cognitive ability that most strongly predicts early career success for the MBA graduates

studied here. Neither GCA nor trait motivation (i.e., conscientiousness) alone is a good predictor of early management success. This finding is consistent with previous studies that failed to find main effects when using graduate admission test scores to predict subsequent salary attainment among MBAs (Harrell et al., 1977; Reder, 1978). Our results suggest these earlier findings may be due to the omission of motivation as a moderator of ability. The relationship becomes clear when ability and motivation are multiplied. It is worth noting that the two individual difference constructs used here, assessed at least three and a half or four and a half years prior to the outcome variables, are statistically and practically predictive of actual job outcomes. The form of the interactions show, not surprisingly, that smart, motivated people do better than those who are either not as smart or not as motivated.

The effect of the interaction between motivation and GCA may change over time and as the MBAs move further along in their careers. For example, to the extent that upward career mobility in and across organizations is based on selecting for those high on motivation and ability, range restriction may mute interactive effects. Despite the comparatively short period of time that the subjects were followed, our findings are intuitively appealing and parsimonious: Intelligence and hard work should be associated with success. It is worth remembering that these results reflect the influence of two important, general individual difference constructs on aggregate variables assessed three and a half or four and a half years later (and longer in the case of the ability assessment). In this regard, both the independent and dependent variables are appropriate global assessments, consistent with Green's (1978: 666) observation that "the fact that global measures do not predict specific behaviors is not an indictment of the measures. It is a failure to appreciate the force of aggregation and the global nature of the general tendencies being measured." Explaining incremental variance on the order of 10 to 20 percent in salary attainment seems practically significant.

These findings are theoretically interesting for several reasons. First, they attest to the importance and relevance of stable individual differences as determinants of individual success in organizations. The constructs are clearly defined and measured. Both general cognitive ability and conscientiousness are well-validated constructs that have been shown to be relevant to performance in organizational contexts (e.g., Hunter, 1986; Barrick and Mount, 1993). Further, the study demonstrates the predictive validity of individual differences by using tangible outcome variables that have face validity and are not likely to be confounded by self-report and response biases. Finally, the effects of both GCA and conscientiousness on managerial performance are easy to fathom. Schmidt, Hunter, and Outerbridge (1986), for example, have explicated the mechanism through which cognitive ability may affect performance. Managers with higher levels of cognitive ability are likely to be quicker at acquiring job knowledge and assimilating new information. People who are more motivated may also accomplish more

and receive higher salary increments than those who are less motivated. Although the joint effect of these two constructs have often been suggested, they have seldom been investigated (Campbell, 1976).

A second reason these results are potentially interesting is their consistency with recent theories about person-situation interactions in personality psychology. Both personality and social psychologists have recognized the interactive nature of social behavior and the limitations of focusing exclusively on either persons or situations. Wright and Mischel (1987: 1163), for instance, have proposed a competency-demand hypothesis that suggests that individual differences should be clearest in "psychologically demanding situations." In this sense, situations can be categorized in terms of the demands they make on people for certain competencies. People who have the relevant competencies are more likely to act in characteristic ways and to perform better than those who lack the requisite competencies. It is the configuration of situational demands and individual competencies that predicts attitudes and behaviors in a particular situation. Wright and Mischel (1988), for example, showed that children who are dispositionally more aggressive are more likely to behave this way in frustrating situations than when observed in routine circumstances. When the situation makes characteristic demands on people with predispositions to engage in situationally relevant ways, those behaviors are likely to occur. Caldwell and O'Reilly (1990) have shown, in a series of studies, that jobs or situations may be profiled in terms of the competencies they require. Individuals whose competencies match those demanded show significantly higher levels of performance and satisfaction. In the context of managerial jobs, there is good evidence that cognitive abilities and a willingness to work hard are frequently demanded (e.g., Arvey, 1986; Barrick and Mount, 1993; Chatman, Caldwell, and O'Reilly, 1994). Those who are higher on both of these dimensions can reasonably be expected to perform better, especially over extended periods of time. This is precisely what the results of this study show.

While previous research on GCA has demonstrated the importance of *g* for job performance, the results presented here suggest a somewhat different picture: It is both GCA and motivation together that lead to success. Motivation and GCA have compensatory effects such that, in this sample, being more highly motivated may compensate for less cognitive ability and vice versa. Previous studies of GCA and job performance have typically used subjects across a range of jobs with different information-processing demands (e.g., Austin and Hanisch, 1990; Ree and Earles, 1992). The impact of *g* in predicting who will be successful at jobs as disparate as cook, avionics technician, or theoretical physicist is likely to be greater than for a sample of people who are all completing a master's degree and going into management. Similarly, the motivation of people across a variety of occupations is also likely to vary more than individuals who choose to enter an MBA program. Thus, one reason we find no strong, independent results for motivation or ability may be the restricted ranges within our sample. The results of

this study can thus be seen as conservative and do not rule out the independent effects of intelligence, motivation, or other individual differences. For instance, Barrick and Mount (1991) showed that extraversion may be related to performance for jobs requiring extensive public contact. It may also be the case that some strong situations can obviate individual differences or that, over time, there may be reciprocal effects of people and situations (Schneider, 1987). In this study, however, it is the interaction of motivation and ability that is associated with early career success as measured by salary and promotion.

One clear implication of the results reported here is that it may be necessary to consider motivation and GCA when investigating the effects of more specific characteristics. As amply demonstrated in previous research, the predictive validity of many tests may reflect an underlying *g* component (e.g., Hunter, 1986; Jensen, 1992a; Schmidt, Ones, and Hunter, 1992), leading to potentially spurious interpretations. This is especially likely in organizational contexts in which our outcome variables may easily reflect underlying cognitive and motivational factors. For instance, Meyer and Shack (1989) have suggested that measures of positive and negative affect may be captured by underlying personality dimensions rather than by separate constructs. Some dispositional constructs that rely on arousal or energetic components, such as negative affect (e.g., Levin and Stokes, 1989), may be surrogates for motivation. Other dispositions, such as self-esteem (Brockner, 1988), may have underlying cognitive components such that those higher in self-esteem may simply be those whose capabilities are greater, resulting in feelings of more self-efficacy. The point here is that individual difference researchers need to offer unambiguous evidence that their constructs are measuring something beyond underlying differences in levels of motivation and cognitive ability.

Practically speaking, the results of this study may have an important implication for MBA programs. If business school faculty and administrators want their graduates to be successful in the terms measured here (choice of jobs, salary attainment, and promotions), it appears that as much attention should be focused on assessing conscientiousness as GMAT scores. While it is possible that undergraduate grade-point average and essays may include a motivational component, they seem to be highly imperfect indicators of conscientiousness. It would certainly be possible to assess conscientiousness more directly through the use of specific essay questions and personal histories with validated scoring systems. Increasing the validity with which trait motivation is measured may significantly enhance the ability of MBA programs to select applicants who are likely to be successful later. Admitting students based primarily on GMAT or other graduate admissions tests does not seem as useful as considering both cognitive ability and motivational predictors.

As Arvey (1986) and others have shown, managerial and professional careers typically place high cognitive demands on incumbents (e.g., Gottfredson, 1986; Schmidt, Ones, and Hunter, 1992). It isn't surprising, then, that success in this

arena may be a function of general cognitive ability and persistent effort. In this sense, the results presented here are intuitive and straightforward. What is surprising is why researchers have spent so little time considering the motivation × ability model, especially in light of continued criticism that individual difference constructs lack predictive power.

Equally remarkable is the lack of attention researchers involved in the person-situation debate have paid to basic individual differences like general cognitive ability and trait motivation. Instead of considering these fundamental individual differences, researchers focused on distal individual characteristics and devoted little attention to the competencies demanded by a particular situation. Organizational research should move beyond the lively but uninformative person-situation debate. As many researchers have already noted, dispositions need to be clearly defined and measured, and situations should be thought of in terms of the demands they place on individual competencies. In this sense, GCA and motivation appear to be broadly useful constructs for exploring person-situation interactions.

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