

# Selection to Ensure Study Success: Looking for Multiple Criteria in the Case of a European Master of Science Program in Business

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**ABSTRACT.** The authors report relations between entrance criteria and study success in a program for a master of science in business. Based on the admission criteria broadly used in European business schools and the findings of prior research, the present authors measured eight criteria for study success in the master's degree program. The authors applied the following criteria: verbal, quantitative, and analytical writing skills; prior knowledge; adjustment to college; social adjustment; personal-emotional adjustment; and attachment. Results revealed that a combination of verbal skills, prior knowledge, academic adjustment, and attachment best predicted study success.

Keywords: admission criteria, GMAT, master of science

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When students seek admission to a program for a master of science (MSc) in business or a master of business administration (MBA), they do so with the intention to graduate eventually. Graduate schools have the same goal in mind and want to do all that is possible to ensure that students have the appropriate backgrounds, competencies, and motivation to succeed in the program. For many years, to accomplish this common goal, the vast majority of the graduate schools of business administration in the United States have already established minimum requirements for admission to their MBA programs (Paolillo, 1982). To gain admission to the program of their choice, applicants must submit a variety of materials, ranging from their Graduate Management Admission Test (GMAT; Hecht & Schrader, 1986) scores and undergraduate grade point average (GPA) to letters of recommendation and work experience (Clayton & Cate, 2004). In this admission process, GPA and standardized test scores such as the GMAT, which administrators use in the form of threshold requirements, determine their decision to admit or reject applicants. Most selection studies have focused on the relations between standardized test scores, undergraduate GPA, and student success in an MBA program (e.g., Clayton & Cate; Graham, 1991; Marks, Watt, & Yetton, 1981). In

general, it seems that a combination of both GMAT scores and GPA explains 8–23% of the variation (Bieker, 1996; Clayton & Cate). Because of this low to modest explanatory power, these scores are questionable as predictors of success, potentially failing to identify successful students. In this respect, many researchers have criticized the GMAT because it is indeed an instrument measuring basic analytical, quantitative, and reasoning abilities, but it does not measure subjective factors that are important to academic career success, such as motivation, creativity, and interpersonal skills (Arnold & Chakravarty, 1996; Bieker, 1996; Clayton & Cate; Wright & Palmer, 1994). Consequently, it is not surprising that the overall recommendation in this kind of study has been to use the GMAT scores and undergraduate GPA as baseline selection criteria and to add additional criteria. In line with these criticisms and recommendations, MBA programs intend to optimize selection policies for graduate admissions. They use additional criteria to minimize the chances of (a) admitting candidates who will not be able to complete their master's degree program successfully (Type I errors) and (b) refusing admission to individuals who would be able to succeed (Type II errors). Application of additional predictors of academic success can reduce the chance of these errors and

consequently promote a better allocation of resources for the individual student and the university (Bieker; Carver and King, 1994). The present study aimed to contribute to the search for valid selection criteria for MSc programs in business. We took into account the European context and the characteristics of MSc business programs in the bachelor's degree and master's degree program structure. In the European context, the minimum requirement for entering a master's program is that students first obtain a bachelor's degree.

### **VALIDITY OF THE GMAT FOR A EUROPEAN MSc BUSINESS PROGRAM**

Researchers have raised questions about the extent to which the results of American studies (e.g., Clayton & Cate, 2004; Graham, 1991; Sternberg, 2004) on the validity of the GMAT can be generalized to a European context. A lot of research on the GMAT, one of the most commonly used instruments for admission purposes to business programs, is in the context of American MBAs. However, recent research in Europe by Dobson, Krapljan-Barr, and Vielba (1999) showed that the validity and fairness of the GMAT is questionable. When assessing test characteristics of the GMAT in a United Kingdom (UK) MBA program, the researchers found that the multiple-choice questions for the GMAT Quantitative section lacked content validity. Moreover, it appears that native English speakers have large advantages over non-native speakers in taking the GMAT. The results of those researchers' study indicates that the GMAT Quantitative section is a weak negative predictor of overall examination performance. In U.S. business schools, the opposite is found; the GMAT Quantitative section is a better predictor than the GMAT Verbal section. Dobson et al. (1999) indicated that the differences in results between the U.S. and UK validity studies were due to differences in assessment culture. The GMAT is a multiple-choice test, and the American business schools use that test format more extensively than do the UK business schools. Therefore, the GMAT Quantitative section, espe-

cially, is probably a better predictor of multiple-choice exam grades (as used in the U.S. business programs) than of essay-style examination grades (as used in the UK business programs).

Although researchers have conducted most validity studies on the GMAT in an MBA context, to the date of the present article many European programs for an MSc in business have implemented the GMAT as well. The GMAT is considered to be a convenient screening device whose usage is independent of the school's location, and whose assessment of relevant abilities for business programs (e.g., numerical and verbal abilities) has been proven. However, MBA and MSc programs in business can differ substantially in target audiences, instructional objectives, program lengths, and students' educational training. Typically, an MBA program educates managers, who already have some experience (usually at least 2 years) on the job, to raise them to a higher level of management (Mintzberg, 2004). With the European program for an MSc in business, the student population is far more heterogeneous in work experience. The introduction of the bachelor's degree and master's degree structure in European universities has increased heterogeneity in student population with respect to nationality, prior degrees, culture, work experience, and prior experience with instructional and study approaches.

Because of the relatively new character of the MSc-in-business programs in Europe, only a few researchers (Beyers & Goossens, 2002; Chamorro-Premuzic & Furnham, 2003; Furnham, Chamorro-Premuzic, & McDougall, 2003; Smith & Naylor, 2001; Wolming, 1999) have focused on the role of selection so far, and none have discussed this role in the context of a bachelor's degree and master's degree program structure. It is apparent that most of these European studies focus on softer predictors of academic success, such as personality traits and adjustment to college. From these studies, it appears that certain personality traits and the degree of adjustment to college are important predictors of academic success. Furthermore, Wolming described the Swedish context and suggested that the programs in Europe are more diverse than MBA programs, as we indicated earlier.

These research outcomes demand a more complex validity of the selection process that also focuses on different student background characteristics. An additional reason for adapting the selection process to changing needs is that many European MSc-in-business programs have implemented nontraditional instructional methods. Carver and King (1994) and others have questioned the extent to which the traditional criteria for admission (GMAT, undergraduate GPA) are appropriate for nontraditional programs such as project-based and problem-based programs. Taking the aforementioned problems and challenges into account, researchers can infer a clear need to assess the merits of admission practices on the basis of the GMAT in the European context. In this respect, there is a need for the use of multiple selection criteria.

### **Multiple Selection Criteria**

To optimize selection policies for graduate admissions, in addition to GMAT and GPA scores, universities have begun to collect information on noncognitive criteria, including letters of recommendation, motivation letters written by the students, details of previous work experience, and the quality of the undergraduate institution that was attended. As Arnold and Chakravarty (1996) showed, this change is problematic because the validity of the measurement of these noncognitive factors is questionable. Because of the subjective nature of the information gathered on these factors, the measurement is difficult to perform unless standardization is possible. Once a standardized procedure for these factors is set, it is ready for use for selection.

In addition, most universities' selection of the additional noncognitive factors is inspired by the practices of other universities and is not grounded within a sound theory of factors explaining or predicting study progress and dropout rates. In this respect, three different strands of research exist. The first strand of research focuses on demographical factors such as gender, age, previous education, residence, and nationality (e.g., Jansen, 1996; Severiens & Joukes, 2001; Smith & Naylor, 2001; Van den Berg, 2002).

This research examines how demographic factors increase understanding of how to identify potentially successful students in graduate programs. The second strand of research considers some personal attributes of students in relation to dropout or study success. Examples of constructs measured are personality traits, attitudes, intentions, commitment, self-regulation, and motivation of the students (e.g., Chamorro-Premuzic & Furnham, 2003; Cooke, Sims, & Peyrefitte, 1995; Furnham, Chamorro-Premuzic, & McDougall, 2003; Guarino, Michael, & Hocevar, 1998). The third strand of research examines the interaction between the variables discerned in the aforementioned strands and adds two important variables: academic integration and social integration (e.g., Prins, 1997; Tinto, 1987). Considering the increasing heterogeneity of the students entering the 1-year European MSc programs and the increasing diversity in instructional approaches, researchers can infer that these variables might play an even more significant role in students' study progress and dropout rates than Prins and Tinto have claimed.

Academic integration indicates how well the student manages the educational demands of the university experience. Academic integration involves activities in the classrooms and interactions with various faculty and staff members whose primary responsibility is the training of students. Social integration involves the interactions between students, faculty, and staff members that take place largely outside the domain of the university (Beyers & Goossens, 2002; Tinto, 1987). Baker and Syrik (1989) and Beyers and Goossens have defined these variables as *academic adjustment* and *social adjustment* and added the variables *attachment* and *personal-emotional adjustment*. Together, the variables generate *adaptation to college*. Attachment is the commitment that the student feels toward the university as an institution. Personal-emotional adjustment indicates whether the student is experiencing general psychological distress. The results of Beyers and Goossens' research revealed that academic adjustment has the strongest positive correlation with the results of the first exam, whereas social adjust-

ment and personal-emotional adjustment had more value for predicting student attrition.

The present study considered the aforementioned interaction models. It focused on the interaction between ability measures (students' scores on the GMAT and GPA), adaptation to college (academic adjustment, social adjustment, and personal-emotional adjustment), and background characteristics (age, gender, nationality, and prior education).

## RESEARCH AIM

The present study aimed to determine the relative importance of the current selection criteria (GMAT and bachelor's GPA) in predicting the master's degree students' academic performances in the context of a European MSc-in-business program, with a heterogeneous student population and nontraditional instructional approach (problem-based learning). Next, we evaluated noncognitive selection criteria in terms of their ability to predict successful academic performance. On the basis of the results of research on students' study progress and dropout rates, we identified relevant selection criteria other than the common ones.

The research context in the present study consists of an MSc program that offers the optimal context to measure the interactions between these variables. First, the student population is very heterogeneous. To an increasing extent, older individuals are entering the program, and an increasing number of students come from various countries. Moreover, these students have different educational backgrounds. They can enroll and study under a degree program. These students may have studied business or nonbusiness, and some have a bachelor's degree and others a master's degree. Second, the master's degree program is very intensive (a 1-year program). Taking into account that many students come from a foreign country, adaptation to college might be more difficult than in the case of a 4-year program in their home country. Expectations are that some students experience personal-emotional and social adaptation problems. Third, the MSc program implemented a problem-based approach with which many students are not famil-

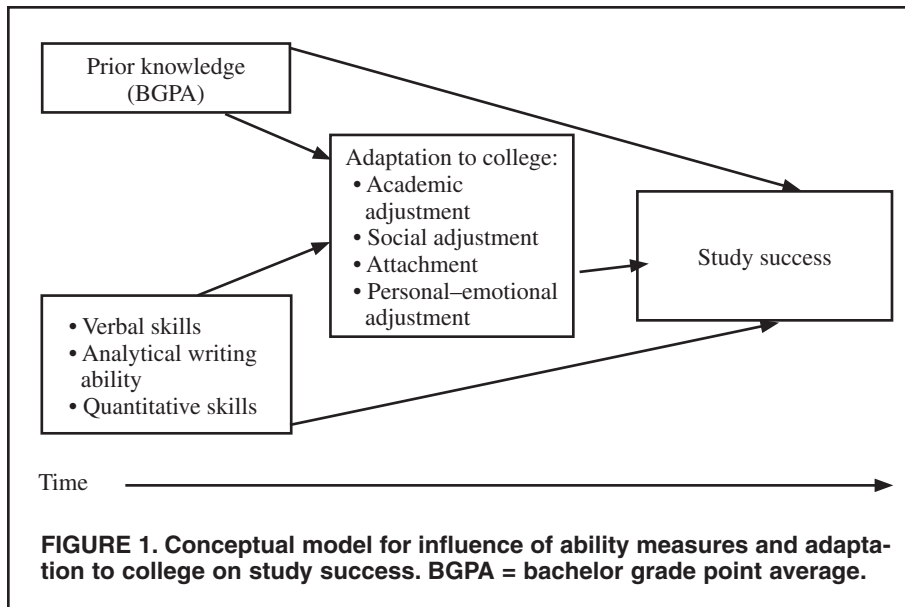
iar, making it even more difficult for foreign students to adapt academically and to become attached to the institution. Therefore, adaptation to college might mediate the effect between cognitive measures in the admission procedure and students' study success in the MSc program. The main research question is this: To what degree do (a) prior knowledge (GPA), (b) adaptation to college, and (c) verbal, analytical writing, and quantitative skills predict study success in the master's program, and can they be used as selection criteria?

In addition to this research question, the study investigated the influence of background characteristics of the students (age, gender, European Union [EU] vs. non-EU) and their previous education (business vs. nonbusiness, university vs. nonuniversity, and bachelor's vs. master's) on the dependent variables and the independent variables. These data serve as a basis from which researchers can look for the differential merits of the selection criteria that schools use. We schematized the model that we tested in the present study in Figure 1.

## METHOD

### Sample

In most American validation studies, for large sample sizes, the sample comprises a conjunction of several student cohorts (e.g., Arnold & Chakravarty, 1996). Despite the advantage of large sample sizes, to the date of the present article, combining data in several cohorts has been questionable for the context of a European MSc program because the master's degree programs are relatively new (for many of them, students have enrolled for only 2 academic years) and therefore under continuous change. Consequently, because most MSc programs in business have only small student populations in comparison with MBA programs, to date, sample sizes for validation studies in a European MSc program context have been rather small (Smith & Naylor, 2001). For example, Warwick University admits annually a maximum of 80 students to its master's program in business, and the University of Leuven



targets an annual intake of approximately 100 students. Consequently, validation studies that are based on GMAT data only need to collapse their data over a period of time to derive any conclusions about the selectivity of admission policies.

The present study faced a similar constraint. The results of 50 full-time students who were accepted into the MSc-in-business program were taken into account. However, the focus on the use of multiple measures deals with sample size problems. This allowed us to assess admission practices without collapsing data over a longer time range. The students have a heterogeneous background concerning gender, age, nationality, and study background. All students had met the admission requirements of the university. Students with a GMAT score of 600 or higher are automatically admitted. However, when students score between 450 and 600, admission depends on an evaluation of undergraduate GPA, motivation letter, and recommendation letters by the admission committee. GMAT scores lower than 450 result in denial of admission.

### Instruments

We operationalized prior knowledge as the undergraduate GPA. Our assumption was that the students' grades from their undergraduate work were a valid reflection of the prior knowledge that the applicants had (as previous studies

in this field have generally accepted; e.g., Youngblood & Martin, 1982).

Adaptation to college, which we operationalized as academic adjustment, social adjustment, personal-emotional adjustment, and attachment were measured by the SACQ (Student Adaptation to College Questionnaire; Baker & Siryk, 1989). Beyers and Goossens (2002) validated the SACQ for a sample of European university students. From that study, it appears that the scores on the SACQ are reliable and valid in a European context.

We measured verbal skills, analytical writing ability, and quantitative skills by the GMAT. Study success manifested in the GPA that students earned in the master's degree program.

### Measures

#### *Dependent Variable*

The dependent variable was the students' cumulative GPA in the master's degree program (master's GPA).

#### *Independent Variables*

The eight aforementioned variables were the input to predicting master's GPA: (a) GMAT Verbal section, (b) GMAT Analytical Writing section, (c) GMAT Quantitative section, (d) undergraduate GPA, (e) SACQ academic adjustment, (f) SACQ social adjustment, (g) SACQ personal-emotional adjustment, and (h) SACQ attachment.

### Procedure

In general, researchers have used two different kinds of research methods to conduct selection studies. The first method is to apply the current admission criteria on a cohort of students who have already finished the curriculum and to see whether these admission criteria would have been the right ones (e.g., Bieker, 1996; Paolillo, 1982). It seems from these studies that heavy reliance on quantifiable standards and pre-established regression equations would be inadequate. The second research method is to make a selection on the basis of certain criteria and to test the impact of that selection on study results (e.g., Arnold & Chakravarty, 1996). The problem with this kind of research is that biased results that are due to range restrictions are a possible pitfall (Wright & Palmer, 1994). In the present study, unfortunately, this same restriction to this second research method was necessary. Student admission took place on the basis of undergraduate GPA and GMAT scores, and the analysis focused on the impact of that selection on the study results. However, by adding noncognitive process criteria to the cognitive entry criteria, this restriction was minimized. Therefore, after 1 month of study, the students admitted to the program filled in the SACQ. By adding noncognitive process criteria, we found more differentiation in this admitted student group.

### Methods of Analysis

Because of the heterogeneous character of the student population, we used *t* tests on the data to look for the differential merit of the selection criteria used for different subgroups. Also, we used two backward regression analyses to test the model, because of the exploratory character of the study. The first analysis focused on the cognitive ability measures, and in the second analysis we added the more noncognitive measures. This analysis served as input for path analyses. The adequacy of the models was assessed by LISREL version 8.52 (Jöreskog & Sörbom, 2002). The models were tested with standardized coefficients from the Maximum Likelihood Method of Estimation (MLE). To



ascertain the model fit, the comparative fit index (CFI), nonnormed fit index (NNFI), the standardized root mean square residual (SRMR), and the chi-square test statistic were emphasized. Values of the CFI and NNFI greater than .90 and .95, respectively, are typically taken to reflect acceptable and excellent fits to the data (Schumacker & Lomax, 1996). In contrast to the CFI, the NNFI contains a penalty for a lack of parsimony of the model (Guay, Marsh, & Boivin, 2003). Hu and Bentler (1999) suggested the use of the SRMR in evaluating the model fit, with values less than .08 as an indication of a relatively good fit between the hypothesized model and the observed data. Only statistically significant paths are included in Figure 2.

## RESULTS

### Influence of Background Characteristics and Previous Education

To examine the influence of the heterogeneity of the student population on the variables tested, we performed *t* tests to look for differences between groups of people (man vs. woman, EU vs. non-EU, university vs. nonuniversity, master's degree vs. bachelor's degree, business vs. nonbusiness). From these *t* tests it

appeared that, for prior knowledge (as measured by the undergraduate GPA) no significant differences between groups occurred. For GMAT scores, however, there were some significant differences for certain groups. The first difference was that on the GMAT verbal score, students coming from the EU ( $M = 29.17$ ,  $SD = 6.21$ ) scored significantly higher than non-EU students ( $M = 22.08$ ,  $SD = 8.89$ ),  $t(47) = 3.13$ ,  $p = .003$ . In contrast, however, for the quantitative skills measured by the GMAT, the EU students ( $M = 36.81$ ,  $SD = 6.88$ ) scored lower than the non-EU students ( $M = 45.00$ ,  $SD = 5.73$ ),  $t(47) = -3.83$ ,  $p = .00$ . This confirms research results from Dobson, Krapljan-Barr, and Vielba (1999) indicating that GMAT Quantitative section and GMAT Verbal section often have contrasting results. Those authors argued that a possible explanation for these differences is the cultural difference concerning assessment. In American business schools, in contrast to European business schools, students are often confronted with multiple-choice exams, and the GMAT is also a multiple-choice exam. Furthermore, students with a university bachelor's degree ( $M = 41.04$ ,  $SD = 6.87$ ) score significantly higher on the GMAT Quantitative section than students with a nonuniversity bachelor's degree ( $M = 36.83$ ,  $SD = 7.64$ ),  $t(47) = 2.03$ ,  $p = .048$ .

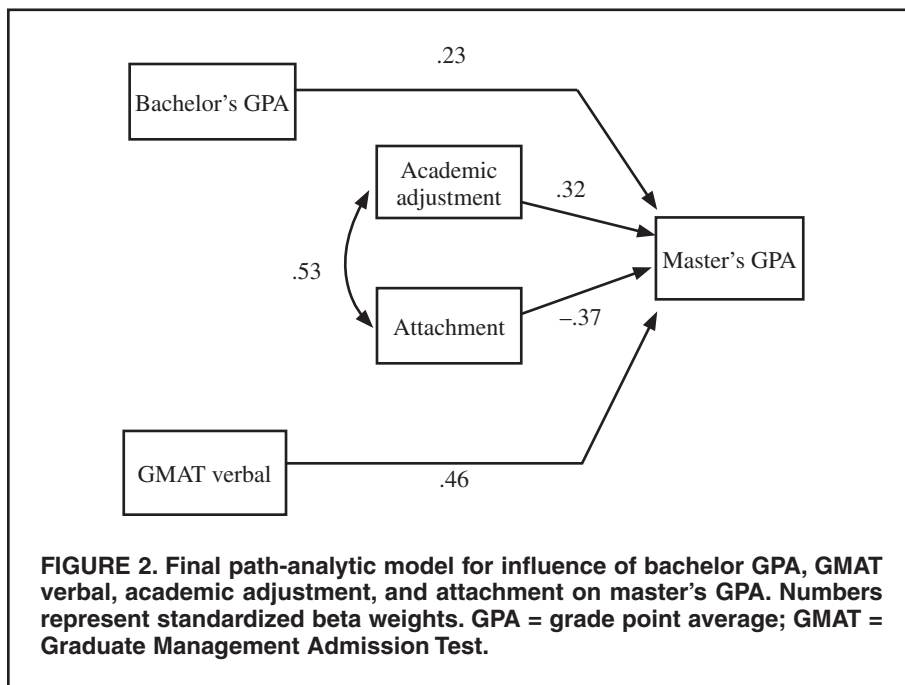
From the scores on the GMAT, it appears that students with a university bachelor's degree have higher quantitative skills than those with a nonuniversity bachelor's degree. Additionally, non-EU students have better quantitative skills but worse verbal skills than EU students. From the *t* tests concerning adjustment to college, we found a small significant difference for students with business backgrounds versus those with nonbusiness backgrounds (average business students = 98.3,  $SD = 10.34$ ; average nonbusiness students = 89.7,  $SD = 20.06$ ),  $t(48) = 2.0$ ,  $p = .051$ .

The only significant difference was that students with a business background had a higher attachment to the institution than did students with a nonbusiness background. Two results at a significance level of .06 indicated that students who had already attained a master's level diploma were better socially adjusted than were students with a bachelor's level diploma, and EU students had a higher score on personal-emotional adjustment than non-EU students. The conclusion regarding adjustment to college was that students with a business background had a higher degree of attachment than students with a nonbusiness background.

Furthermore, we assessed possible differences between groups with different backgrounds in relation to master's GPA. The empirical data indicate no significant differences between students' background and master's GPA except with respect to EU and non-EU students:  $M$  EU = 7.68,  $SD = .42$ ;  $M$  non-EU = 7.21,  $SD = .67$ ;  $t(13.95) = 2.28$ ;  $p = .39$ . Next, we split the sample up into these two groups to evaluate correlation patterns within these groups, comparing them with the total sample. However, it appeared that they showed the same correlation patterns as the total sample. Consequently, the total sample served as a basis for the remaining analysis.

### Interaction Model

To test the influence of the cognitive variables in the model, Table 1 showed the predictive validity of undergraduate GPA and GMAT scores on master's GPA. The variables that we entered into



**FIGURE 2. Final path-analytic model for influence of bachelor GPA, GMAT verbal, academic adjustment, and attachment on master's GPA. Numbers represent standardized beta weights. GPA = grade point average; GMAT = Graduate Management Admission Test.**

**TABLE 1. Summary of Backward Linear Regression Analysis for Bachelor GPA and GMAT Scores Predicting Master's GPA (N = 41)**

Variable	$\beta$	B	t(39)	p	R <sup>2</sup>
GMAT verbal	.009	0.404	2.914	.006	
Bachelor GPA	.076	0.270	1.948	.059	
Model					.253

Note. GMAT = Graduate Management Admission Test; GPA = grade point average.

the regression equation—undergraduate GPA and GMAT Verbal score—accounted for 25.3% of the variance that we explained in master's GPA. This percentage was high in comparison with those of previous studies (8–23%) measuring the effect of only the GMAT score and undergraduate GPA on the cumulative GPA in the master's degree program. This means that the better the verbal skills were and the better the prior knowledge was, the higher the grades were that students attained in the master's degree program. The other variables were not significant, and therefore we excluded them from the equation. Table 2 shows the inclusion of noncognitive variables in the analysis. We performed a new backward linear regression analysis. Table 2 shows that a combination of the scores on measures of SACQ attachment (negative relationship), SACQ academic adjustment, GMAT Verbal section, and undergraduate GPA is the best predictor of cumulative GPA in the master's degree program. This means good verbal skills, a good prior knowledge base, a high degree of academic adjustment, and a low degree of attachment best predict the study success of students. Together, these factors explain 39.2% of the vari-

ance in cumulative GPA in the master's degree program.

To look for the indirect relationships between undergraduate GPA, GMAT, and master's GPA, we conducted a path analysis on the data set. From this, it appeared that although the fit of this model was acceptable for some of the indicators, improvement was possible. Therefore, via path analysis, the best possible model was built. Figure 2 shows the final model that we obtained by the path analysis. This model confirmed the results from the regression analysis and was acceptable (chi-square = 2.51;  $p = .77$ ; CFI = 1.00; NNFI = 1.175; SRMR = .059). The most striking result of this analysis was that academic adjustment and attachment did not correlate with the scores on undergraduate GPA and GMAT Verbal section and did not serve as mediator between these variables and the scores on master's GPA.

## DISCUSSION

The present study points toward key variables that may be useful to educators in screening applicants for admission to a Master of Business Studies program. The results confirm earlier research by

Bieker (1996) and Clayton and Cate (2004), indicating that GMAT scores of different divisions of the GMAT in combination with undergraduate GPA are moderate predictors for the cumulative GPA in the master's. In the present study, the GMAT Verbal score and undergraduate GPA explain 25.3% of the master's GPA. Dobson, Krapljan-Barr, and Vielba (1999) gave a possible reason why the GMAT Verbal score plays such an important role. The authors stated that the GMAT Verbal section measures reading comprehension and verbal reasoning, which are requirements for all MBA students throughout their studies. They seem to be prerequisites to success in an MBA program.

The rather moderate predictive value of these ability measures leads researchers to the conclusion that other variables might play an important role in determining whether a student will be successful in the master's degree program. Therefore, we added (a) the students' adaptation to college, which we operationalized as academic, social, and personal-emotional adjustments, and (b) the students' attachment to the analysis. The results indicate that attachment (negatively) and academic adjustment are the most important factors in explaining GPA in the master's degree program. The less that students attach to the university, the better their master's GPA. The fact that students in a 1-year master's degree program do not have the time to reach a deep level of involvement can explain this. If they do spend time getting involved, that time might negatively influence their results. Furthermore, the more that the students adjust academically, the better their grades become. For a 1-year master's degree program, it seems to be very important to get to know your colleagues (students and teachers) as soon as possible so that the focus can be on the study program.

In general, the results of this study indicate that a combination of verbal intelligence, prior knowledge, attachment (negative relationship), and academic adjustment gives the best prediction of the variance in the master's GPA: 39.2%.

The first practical implication of this study is that admission boards can enhance the overall quality of admission

**TABLE 2. Summary of Backward Linear Regression Analysis for Variables Predicting Master's GPA (N = 41)**

Variable	$\beta$	B	t(39)	p	R <sup>2</sup>
Attachment	-.013	-0.367	-2.432	.020	
Academic adjustment	.008	0.403	2.635	.012	
GMAT verbal	.028	0.419	3.252	.002	
Bachelor GPA	.173	0.317	2.420	.021	
Model				.001	.392

Note. GMAT = Graduate Management Admission Test; GPA = grade point average.

decisions by collecting information on factors additional to the GMAT and undergraduate GPA. Adding the SACQ to the selection procedure is a possible solution. However, when using the SACQ as a selection criterion, biased results might occur. Although there is no empirical evidence so far, it is likely that students show desired behavior on this test when it is used as a selection criterion. To prevent bias, a possible solution would be to conduct a baseline selection based on cognitive measures that is insensitive to desired behavior and to add noncognitive measures such as the SACQ as part of the study guidance system. The SACQ could serve as an early warning system and an input for coaching students.

A second practical implication is that, because academic integration plays an important role in study success, institutions can set up action points to ameliorate this academic integration. Setting up learning communities where people share interests in academic subject matter, as proposed by Tinto (1998), is a possible answer.

A third practical implication is that non-EU students encounter more problems in adjustment to college than EU students. Furthermore, they have a lower GPA in the master's degree program. Therefore, it might be necessary to give some specific guidance to this group of students to overcome their background difference. Our study sheds more light on the mechanisms underlying students' success in an MBA program after selection based on the GMAT. The present study shows the predictive value of cognitive measures, such as the undergraduate GPA and the GMAT scores for selection needs, but at the same time it indicates the need for researchers and educators to know more about how student adjustment to academic life interacts with the capabilities that they bring to a program. Future researchers should focus on repeatedly testing the described model. In the coming years, data will be available for consecutive cohorts of master's degree students so that researchers will be able to analyze the influence of cohort characteristics and program features on the direct and indirect relations in the model. Moreover, to understand the influence of

program features, it would be interesting to compare the described model in different European MSc business programs. Next, to gain better insight into the interaction between the cognitive and noncognitive measures discerned in the model, it would be challenging to compare the model for students who study the master's degree program within the same institution as they did their bachelor's degree program (and for whom the GMAT is not an admission requirement) with the model for students from outside the institution (with GMAT scores). That comparison could indicate the relative influence of the cognitive measures in interaction with noncognitive measures on study success in the master's degree program. Moreover, for the master's degree students who received their bachelor's degree at the same institution, gathering of SACQ data during the bachelor's phase and the master's degree program would enable repeated SACQ measures and the determination of SACQ's relations with student progress as measured through the master's GPA score. Such research could shed light on the processes underlying the paths in the model as researchers know it.

#### NOTES

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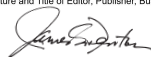
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