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Examining the Influence of Admission Criteria and English Grades on Performance in Science and Humanities Courses at a Saudi Medical University

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ABSTRACT

Purpose This study explored the association between admission criteria and performance on English language skills with academic achievement in Science and Humanities. The admission criteria include the General Aptitude Test (GAT), High School Grade Point Average (HSGPA), Scholastic Achievement Admission Test (SAAT), and Balanced Percentage (BP). **Methodology** Correlational analyses were conducted to explore these relationships using a substantial sample size (N = 1,595) drawn from the first year of the pre-professional program (PPP) at a Saudi medical university. **Results.** The findings reveal that the prerequisite English language skills classes could provide criteria for boosting college achievements. For instance, in admission criteria, while all variables demonstrated a significant association with academic achievement in science and humanities courses, there was a differential association among variables. Specifically, GAT scores were the least predictive of academic achievement among the admission criteria, followed by SAAT and HSGPA,

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while BP was the strongest predictor. Furthermore, English skills scores showed a strong and positive relationship with their overall academic achievement. **Implications for research and practice**. The results provide evidence for policy makers to use BP scores as the most reliable of these criteria in order to predict student's overall academic outcomes and their performance in Science and Humanities courses.

Introduction

Saudi universities implement specific admission criteria for prospective undergraduate students, encompassing evaluations of high school grades, the General Aptitude Test (GAT), the Scholastic Achievement Admission Test (SAAT), and corrected percentage scores. Each academic institution sets its own benchmarks and minimum thresholds for these criteria. Studies have shown that while high school grades are strong indicators of long-term academic performance, standardized test scores can be less consistent predictors, especially across diverse student populations (Zwick, 2007). Studies have also taken serious steps to clarify the effectiveness of each admission criterion, and have contributed to the ongoing global conversation on refining these criteria for better support to students and help them succeed and achieve educational equity (Concha-Arriagada, 2023; Faiz et al., 2023; Lee et al., 2023; Wu et al., 2023; Yan et al., 2024). Admission policies, too, increasingly aim to select students who will succeed across a range of disciplines and come from diverse backgrounds (Geiser & Santelices, 2007; Hiss & Franks, 2014).

Upon successful admission in a Saudi university, students typically undergo a preliminary one-year general learning program prior to admitting them into a major. At this preparatory stage, there are delineating measures and interrelationships among admission criteria, considering students' overall English grades, and their academic performance in humanities and science courses during this first year of the pre-professional program to determine their graduation major. This pre-professional program is explicitly structured to equip students with requisite English language proficiency and fundamental scientific competencies, subsequently categorizing them into distinct colleges based on their cumulative Grade Point Average (GPA). Hence, right from this pre-professional year, the focus remains on defining appropriate admission criteria required to secure admission in a Saudi university.

The focus on complying with admission standards and acquiring a minimum level of English proficiency is, therefore, critical for students to advance into their desired major. Previous research studies highlight that language skills impact students' ability to understand and engage with complex course material, which is essential for success in both science and humanities courses (Martirosyan et al., 2015; Zhang & Goodson, 2011). A major challenge felt in this state of affairs is to delineate the interrelationships among various admission criteria such as students' overall English grades, and their academic performance in both Science and Humanities courses within the first year of the preparatory year. This kind of intervention would assist universities in 1) reconsidering their admissions processes, 2) understanding how to foster students' academic strengths

and success, and 3) assessing other relevant contextual influences that urge holistic investigation.

The goal of this study was, therefore, to examine the correlations between each admission criterion and academic outcomes, in order to identify which criteria might be the strongest predictors of success, particularly in fields with distinct academic demands, such as science and humanities. at a university for health sciences in Saudi Arabia. In a broader sense, this research examines first-year students' performance in Science and Humanities longitudinally to identify whether admission criteria are closely associated with students' performance in Science and Humanities and whether their performance in English displays any relationship with Science and Humanities. The findings of this study would provide insights for policymakers and educators by addressing how well various admission standards serve as predictors of academic achievement.

Literature Review

This research is situated within a broader discourse concerning the relationship between admission criteria and students' academic advancement in higher education contexts. Several studies have previously engaged with this topic, including notable contributions by Black et al. (2023), Cortes and Lincove (2019), de Boer and Van Rijnsoever (2021), Kamis et al. (2023), Krings et al. (2020), and McManus et al. (2011). Research has yielded inconsistent findings, thereby igniting further research discussions. Some studies vary regarding the correlation level between admission criteria and academic success, moderate to high or even low. The outcome variability is often attributed to contextual dissimilarities and the distinctive educational requisites inherent in each study. For instance, Ferguson et al. (2002)'s systematic review of correlation studies posited that unexplained variance could extend up to 70%. Donnon et al. (2007) identified a moderate to high correlation, whereas Lynch et al. (2009) reported a low to moderate correlation. Later, Callahan et al. (2010) discovered a moderate correlation.

Scholars in the field have argued that high school grades may not be sufficient to accurately predict the success of the candidate college students (Coebergh, 2003; Hiss & Franks, 2014). Institutions in the United States shifted their admission criteria policies towards test-optional procedures, and they reported that students who were admitted without standardized test scores performed comparably to those who submitted their scores (Hiss & Franks, 2014). Coebergh (2003) noted that few European countries excluded high school grades due to the differences in curriculum and pedagogical practices between high school and college. On the other hand, other policymakers, like in China, have strongly emphasized a meritocratic system that counts on high-stakes standardized testing (Li & Qiu, 2023; Yan et al., 2024). These variations emphasize the importance of a multifaceted approach to admissions and remain a subject urging reliable investigation to ensure fairness and efficacy for all students in global and local contexts (Concha-Arriagada, 2023; Faiz et al., 2023; Lee et al., 2023).

Moreover, existing literature suggests that although the correlation between admission criteria and academic performance is most stressed in the initial semesters, such correlation gradually diminishes over time (Bie & Yi, 2024; Maruyama et al., 2024; McManus et al., 2003; Tamimi et al., 2023) however, this decrease in correlation remains unclear. Educators would relate this issue to the nature of the college courses that necessitate academic

challenges and extensive study commitments. These factors may influence academic performance in ways not identified by admission criteria. Consequently, future research must conduct in-depth investigations into this matter, examining potential factors that may affect the relationship between admission criteria and academic performance over an extended period (Bastedo & Bowman, 2017; Bastedo et al., 2018; Black et al., 2023).

In Saudi Arabia, universities implement specific admission criteria for prospective undergraduate students. The admission criteria encompass the evaluations of students' high school grades (HSGPA), the General Aptitude Test (GAT), the Scholastic Achievement Admission Test (SAAT), and the Balanced Percentage (BP) derived from these three assessments. Each academic institution sets its own benchmarks and minimum thresholds for these criteria. Upon successful admission, students typically undergo a preliminary preparatory year of a pre-professional program (PPP) before pursuing a specific major.

Research Context

The PPPs (Pre-Professional Programs) are designed for undergraduate students to enroll in preparatory courses before pursuing their higher education majors (Alkhateeb & Waleed Daweli, 2024; Yu et al., 2024). These courses are essential for students who wish to pursue their desired majors in professional schools, such as law, engineering, pharmacy, and medicine. These programs help high school students bridge the knowledge and professionalism gaps between high school and higher education. This goal can be achieved by offering courses in English, sciences, Islamic culture, and Arabic language and by providing research experience. The PPP consists of four academic semesters, each encompassing eighteen credit hours and employing English as a Medium of Instruction (EMI).

In the first semester, students are required to complete four courses in English as a Foreign Language (EFL), one course in Arabic, and one in Islamic culture. The second semester includes three basic science courses—Biology, Chemistry, and Physics—totaling ten credit hours, along with three advanced EFL courses and another course in Arabic. During the third semester, students take one English course, one research skills course, and five science courses, including Biochemistry and Immunology, Biostatistics, Computer Science, and Medical Terminology. Finally, the fourth semester focuses exclusively on advanced Health Science courses and Medical Ethics.

The PPP allocates students to their preferred colleges based on their GPA during the first year. Choosing a health science major- Medicine, Dentistry, Pharmacy, or Applied Medical Sciences—depends on students' performance in their first-year courses. The English upper-intermediate and advanced courses are vital stage in this PPP where students commit to attending the daily hours allocated to these courses. English courses promote students' language proficiency level to satisfy the university requirements where English is the medium of instruction. They include Grammar, Writing, Reading Comprehension and Vocabulary, and Oral Communication skills. The Science courses in the program provide students with foundational knowledge in basic science and health science. These courses teach Biology, Physics, Chemistry, Computer science, Health Informatics, Biochemistry, Behavioral Science, Biostatistics, Anatomy and Physiology, Principles of Diseases (which encompass Pathology, Microbiology, and Immunology), Health Education, Basic Pharmacology, Histology, and Human Development.

The Humanities courses in this PPP, which is the most undisguised topic about this university despite its significance, consist of three courses designed to enhance Arabic language and writing skills. In addition, these courses support students' knowledge about their Islamic culture, which is a requirement for all educational institutions in Saudi Arabia. They are prerequisites and significantly determine students' eligibility to pursue their chosen health science track.

Methodology

Research design

A quantitative correlational research design was employed to conduct this study. The data was collected from the students at a Saudi health sciences university that offered a PPP specifically designed for undergraduates to enroll in preparatory courses before pursuing their higher education majors. This program assists high school students in bridging the knowledge and professionalism gaps between high school and advanced education.

Sampling and data collection

The study comprises four distinct samples drawn from the King Saud bin Abdulaziz University for Health Sciences (KSAU-HS) student population in each semester over a two-year span, as explained in detail earlier in Research Context. The data was obtained from first-year students having completed a wide range of academic courses. For females, Sample 1 has 264 students, and Sample 2 includes 357 students. Sample 3 and Sample 4 consisted of 974 male students (481, 493). The total number of respondents in each sample was 1,595 students.

Data analysis

The collected data was students' academic performance, which was assessed based on their English proficiency and combined performance in humanities and science courses. This combined performance in Science and Humanities was treated as a singular variable in the analysis.

The methodology involved the utilization of descriptive statistics, the analysis of variance (ANOVA) through the F test, and correlational analyses to elucidate patterns and relationships within the dataset. These statistical approaches were instrumental in deriving insights from the two-year data and addressing the research questions posed in the study.

Results & Analysis

Relationship between Admission Criteria and Academic Achievement in Science and Humanities Courses

The first goal of this investigation was to explore the association between the admission criteria (GAT, SAAT, HSGPA, and BP) and students' academic achievement in science and humanities courses. To achieve this goal, correlational analyses were conducted between

each admission criterion and students' GPA (academic achievement excluding English courses). There was a significant positive correlation between GAT and GPA (r = 0.383, p = < 0.001), yielding a small effect size (r^2 = 0.146) according to Plonsky and Oswald (2014) guidelines. This indicates that about 15% of the variance in students' achievement in science and humanities courses is explained by students' scores on GAT. Next, the relationship between SAAT and HSGPA with students' GPA was examined. Both variables manifested a significant positive relationship with students' GPA (SAAT: r = 0.459, p = < 0.001; HSGPA: r = 0.437, p = < 0.001). Unlike GAT, the effect sizes of SAAT and HSGPA were medium, r^2 = 0.21 and r^2 = 0.19, respectively. This suggests that 21% and 19% of the variance in GPA can be explained by SAAT scores and HSGPA, respectively. Lastly, regarding the relationship between BP and students' GPA, the analysis revealed that BP manifested the strongest association among the admission criteria (r = 0.538, p = < 0.001), yielding a large effect size (r2 = 0.289). It indicates that around 29% of the variance in students' GPA is attributed to their scores on BP.

The results showed a significant positive relationship between all admission criteria and students' academic achievement in science and humanities courses. As students' scores on the admission criteria increase, they tend to demonstrate better academic performance. However, as indicated by the effect sizes in the correlational analyses, there was a differential association among these criteria with GPA. GAT scores were the least predictive, followed by SAAT and HSGPA, while BP was the strongest predictor of academic achievement. These findings highlight the importance of including BP (as a differentially weighted measure) among the admission criteria, as it enhanced the predictability of students' performance in science and humanities. Table 1 summarizes these relationships.

Table 1

Correlational Analyses between Admission Criteria and Students' Academic Achievement in Science and Humanities

Criterion	GAT	SAAT	HSGPA	BP
Pearsons' *r*	0.383	0.459	0.437	0.538
***p*-value**	< 0.001	< 0.001	< 0.001	< 0.001

Relationship between Performance in English Language Skills Classes and Academic Achievement in Science and Humanities

The second goal of this investigation was to explore the association between students' performance in English language skills classes and their academic achievement in science and humanities courses. According to the correlational analysis, performance in English skills classes had a significant positive association with academic achievement in science and humanities classes (r = 0.701, p = < 0.001), indicating a large effect size (r2 = 0.491). This association indicates that 49% of the variation in students' achievement in science and humanities can be explained by their performance in English skills classes. As their performance in English increases, their achievement in the other courses tends to improve. This finding underscores the importance of including English language skills classes in pre-professional medical programs in Saudi contexts.

Though statistically significant, the correlation between GPA in English and science and humanities courses is not very strong to infer that a high grade, like an A+ in English, is associated with the same high-grade A+ in science and humanity.

Discussion

This study attempted to identify the relationships between students' academic achievement and the criteria for university admissions: the Graduate Admission Test (GAT), Scholastic Assessment Admission Test (SAAT), High School Grade Point Average (HSGPA), and the Balanced Percentage (BP) of these three tests. The findings showed a significant relationship between all admission criteria and students' performance in Humanities and Science courses among all male and female samples and the combined one. In addition, the students with high English grades also performed better in Science and Humanities. Nevertheless, the degree of this association reflects notable variations.

Admission Criteria, Humanities and Sciences

In response to the first study's question, the data shows a strong correlation between each of the admission criteria and students' GPAs, which serve as a measure of academic success in Science and Humanities. Performance levels (GPA codes) vary significantly; in other words, there is a remarkable difference in the performance levels where each code shows distinct mean value for respective criteria. However, GAT achieves the lowest association degree among all combined samples. In terms of predictivity, a student whose GAT score is 85.45 would likely obtain a GPA of 3 in Humanities and Science subjects. Conversely, a student who scores under 85.45 would have a chance of earning a 3-point GPA, but it is less likely.

This association between GAT scores and performance in Humanities and Science subjects is due to the nature and structure of the GAT assessment, which emphasizes linguistic and analytical reasoning skills necessary to succeed in those two fields of study. The results of SAAT and HSGPA indicate a stronger effect on academic performance than GAT does. On the other hand, the large effect size of BP indicates that this criterion is the best predictor for academic success. Accordingly, this result suggests that decision-makers in higher education prioritize BP score to anticipate students' success in their college studies. Overall, these correlations support the idea of a more comprehensive admission model that reflects a broader array of student abilities as opposed to a single standardized test score or GPA. However, alternative approaches to student assessment can offer in-depth analysis and understanding of freshmen's potential, such as interviews and psychological evaluations (Ann Courneya et al., 2005; Ferguson et al., 2002; Ihlenfeldt & Rios, 2022; Lynch et al., 2009). Structured interviews have proven to be reliable in evaluating students' academic readiness, while psychometric tests effectively assess personality traits (Al-Ani & Kazem, 2023; Wu et al., 2023).

In addition, this study did not address gender differences, which might be a limitation. Maruyama et al. (2024) found that high school GPA is a strong predictor of college success for female student, likely because GPA reflects ongoing academic persistence over time and captures students' performance across school subjects and several required skills. This

cumulative score of GPA can be considered a reliable indicator of college success, regardless of the discipline.

Another study by Chetty et al. (2020) found that SAT (Scholastic Assessment Test) and ACT (American College Testing) scores correlate more strongly with college GPAs for male students, particularly in STEM (science, technology, mathematics, and engineering) disciplines, indicating that such test questions measure relevant analytical skills. In Saygin (2019)'s study, while females generally outperform males in GPA, males outperform females in quantitative standardized tests. These studies highlight the complex roles that GPA and standardized tests play in predicting academic success between females and males. This suggests a need for further research considering the gender difference factor.

English Language Courses

The results show that students proficient in English can succeed in Humanities and Science courses, especially in science, where English is the medium of instruction. This positive association is consistent with results from another study by Alharbi (2015), who found that Saudi students with higher English language skills performed better across different subjects. This was attributed to their increased capacity to grasp the lectures, take an active part in discussions, and finalize tasks efficiently. Similarly, Heng (2019) also noted that language barriers posed significant challenges for international students in STEM courses, affecting their academic performance and confidence. Some college institutions require new students to participate in specific language programs, and others stress the importance of such programs to improve students' academic success, where English is the language of instruction. For example, Martirosyan et al. (2015) discovered that students with higher English proficiency achieved higher academic performance due to their capability to communicate with course content and assessments. Zhang and Goodson (2011) emphasized that language proficiency is critical for students' psychosocial and academic success. It enables students' smooth social interactions, subsequently ensuring their sense of belonging and supporting academic outcomes. Moreover, Li and Grineva (2017) found that English proficiency greatly affects students' social and academic adjustment. In particular, they found that students with higher English proficiency face fewer barriers to understanding their complex coursework (Martirosyan et al., 2015; Zhang & Goodson, 2011), participating in discussions, and meeting academic expectations, as in Tang (2020)'s study. Overall, these findings highlight how English programs are crucial for students' success in higher education.

In summary, the current research aligns with the findings of previous studies that stressed the role of English language proficiency in students' academic achievement, particularly in Humanities and Sciences. Students with low English proficiency may encounter challenges in other disciplines. Further investigation should be conducted in future studies investigation into this relationship to enhance students' language proficiency and, consequently, their academic performance.

Conclusion

This study attempted to understand the significance of Saudi higher education's admission criteria (GAT, SAAT, **HSGPA**, BP) on students' academic achievement. It examined the relationship of these criteria with Science and Humanities outcomes and

whether these outcomes in these two fields were somehow associated with the overall performance in English courses. The findings showed that GAT was significantly association with students' aptitude in both Sciences and Humanities courses. Although GAT showed its potential as an indicator of students' performance in Science and Humanities, the exclusion of the other admission criteria would hinder the understanding of students' future potentials.

Given BP's prominent effect size as a predictor of academic achievement, universities can improve the quality of the incoming cohorts by focusing on BP as performance in this area has been found to have a strong correlation with later academic achievement. Moreover, the research found that students' English grades are directly related to their performance in both Science and Humanities courses. This association highlights the importance of English language skills in enhancing students' learning of other disciplines; in addition, it suggests the need for incorporating English programs into higher education curriculum, particularly, in multidisciplinary contexts like health sciences schools.

While this study offers valuable insights, some limitations should be acknowledged for future research consideration. The study did not examine each science course or account for their grades individually, i.e., within each course. Including these factors would provide more precise outcomes and a valid interpretation of the most salient predictors of academic performance and success. Also, it did not exclusively evaluate the interconnection between English and science or control for confounding factors to enhance accuracy and reliability of the findings. Furthermore, as this study limited itself to first-year students of the PPP at a health sciences university, it would be worthwhile to replicate this study on a larger scale, such as different Saudi universities, to obtain more comprehensive findings. Previous studies have discussed the differences in achievements between male and female students. However, this research did not aim to compare these differences, as the emerging data indicated that females had higher high school grades but lower scores in GAT, SAAT, and BP than males across the four samples. There were some exceptions, and the differences were inconsistent across all four samples, which would require further study.

In light of the findings, several implications for admission criteria at Saudi higher education level can be recommended. First, due to the moderate or weak association between admission criteria and students' performance in sciences and humanities courses from one hand and English courses on the other hand, institutions should consider employing a holistic admission process that accounts for a broader range of student competencies and experiences in addition to the quantitative assessments. Universities would include commitment and active learning/willingness criteria by reviewing students' portfolio or conducting one-to-one interviews with candidate students to get more understanding of their potential regarding college studies and achievement.

Moreover, English placement test is another criterion to be added to the admission requirements prior health sciences program. This test would verify candidates' English proficiency and capability to satisfy the required English level across university courses. In addition, it may be beneficial to create a general aptitude test specifically designed for health sciences students, instead of relying solely on the assessments provided by the Ministry of Education. Future researchers in this field can build upon the findings of this study, considering other factors, and provide insightful discussion regarding the complex

relationship between English proficiency, science and humanities courses, and their impact on overall student performance.

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