

## Article

# Comprehensive Investigation of Factors Influencing University Students' Academic Performance in Saudi Arabia

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**Abstract:** Academic success in undergraduate programs is indicative of potential achievements for graduates in their professional careers. The reasons for an outstanding performance are complex and influenced by several principles and factors. An example of this complexity is that success factors might change depending on the culture of students. The relationship of 32 factors with the reported academic performance (RAP) was investigated by using a survey distributed over four key universities in Saudi Arabia. A total of 3565 Saudi undergraduate students completed the survey. The examined factors included those related to upbringing, K-12 education, and structured and unstructured activities. Statistical results validate that many factors had a significant relationship with the RAP. Among those factors, paternal's education level and work field, type of intermediate and high schools, and the attendance of prayers in mosques were significantly associated with the reported performance. This study provides important insights into the potential root causes of success so that they can be targeted by educators and policy makers in the effort to enhance education outcomes.

**Keywords:** K-12 education; parents' education; academic performance



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## 1. Introduction

Throughout human evolution, the quality of education and its outcomes have been the key reasons for nations to have sustainable growth. High education is the source of an advanced workforce in most countries. Hence, reforming educational programs and examining reasons for impacting learners are highly significant for education institutions and educators. According to constructivism principles, the previous experiences and practices of students most likely affect academic performance by wide variety of factors that are likely to influence their learning outcome. Furthermore, many studies have investigated factors that influence academic performance. For instance, studies have been conducted to test the effects of class size [1], the effects of living on or off campus [2], learning facilities, family guidance and support [3], extracurricular activities [4], and the attitudes of learners [5].

The literature review shows that little research on factors influencing academic performance in Saudi Arabia, which has its own culture and environment, has been conducted. Numerous factors can affect student performance. Factors can be internal (e.g., personality, motivation, and passion) or external (e.g., socio-economic factors) ones that are out of the control of students. Several studies have explored the key internal and external factors to examine their effects on academic performance. The following section gives a brief background on education system in Saudi Arabia, followed by a literature review of eight factors that influence academic performance of students.

### 1.1. Background on the Education System in Saudi Arabia

The education system of Saudi Arabia was formally established in 1953 by three government institutions. Then, it was ruled by two institutions, the first being the Ministry of Education (MoE), which functions to “range from policy-making, planning and budgetary staffing to provide physical and teaching materials and supplement all elementary, intermediate and secondary schools” [6]. The second institution was the Ministry of Higher Education (MoHE), which was established in 1975 to administer, develop, and coordinate the demands of the Kingdom with regards to higher education. At that time, the MoHE supported and maintained the development of all the universities of the country, i.e., for male and female colleges. Diplomas, bachelors, masters, and Ph.D. degrees in divergent scientific and humanity specializations were offered. In addition, there were no private universities in the Kingdom prior to 1999/2000 and there were only seven government-funded universities. Currently, there are 29 universities in total, all of which are under the supervision of the MoE. Furthermore, education in Saudi Arabia is supported by the government and no tuition fees are charged.

Each year, all students who want to apply to a university must submit an application to a unified website system called “unified admission system for universities” run by the MoE, which then distributes applicants into universities. Moreover, all high school students in Saudi Arabia who apply to universities come from five different types of schools: government and private schools that offer identical curriculum, Islamic schools which focus more with religious curriculum, international schools which offer similar curriculum to private school with some addition of material from overseas schools and taught mainly in English language, and finally, overseas schools which are Saudi schools that are located overseas. Additionally, admitted students to universities start studying in a preparatory year, a one-year program before undergraduate academic programs. In addition, two local tests, namely the *Tahseel* and *Qyias* ability tests, must be taken by all students in high school as of 2007. The *Tahseel* test is for evaluating student levels on all high school subjects, and the *Qyias* test is for testing the ability to analyze the cognitive skills of students in K11-12. Those tests are administered by the Education and Training Evaluation Commission. Furthermore, the two tests and high school grades are used in university admission scores using a weight as follows: 20% of high school, 40% of the *Qyias* test, and 40% of the *Tahseel* test. Finally, grades from the preparatory year are the main basis for admission into college, and some colleges consider *Tahseel* and *Qyias* scores, as well.

Given that students in Saudi Arabia are enrolled in the preparatory year and proceed in their academic programs and follow constructivism theory, they are affected by several factors that possibly impact their academic performance.

### 1.2. Prior Experiences and Achievements

Constructivism theory claims that the knowledge of learners is affected by accumulated experiences of learners [7]. Learners connect life experiences and personal standpoints with the learning environment [8], i.e., education and prior knowledge and practices, family background, lifestyle, religious practices in some countries, motivation, and the personalities of learners. Therefore, the constructivism theory was chosen because it covers all possible factors that can affect students’ learning outcome. Further, learning becomes an active process affected by internal and external factors besides the process of gathered involvements and attitudes, and these factors influence acquired learning. Nevertheless, constructivism describes the development of learning outlines for learners to collaboratively interact/impact with diverse facets associated with different issues [9]. Gaining knowledge is viewed as socially constructed; thus, learners (persons) affected by the social context must be considered according to the vision of Vygotsky [10]. Moreover, they begin to exercise more control and annunciate explanations to a degree that accords with their ability to learn. This ability is also related to/affected by culture [11].

### 1.3. Previous Academic Achievements

Generally, there are different opinions about the predictive value of prior-examination performances upon future prospects for success. Staffolani and Bratti [12] observed that a measure of the prior educational achievements of students is the most influential factor on future achievements. Ringland and Pearson [13] also found a correlation between academic performances before and during university years. Hence, the future achievement of students is almost a linear trajectory from their previous one. Conversely, Huws et al. [14] verified that no tangible link emerged between the grades obtained at the A level and the performance at a university among psychology students in the UK. This finding was also supported by the Academic Admission Council at Oregon State University [15]. In similar issues, Rhodd et al. [16] asserted that a foundation year has an impact on education performance. Specifically, they affirmed that students who had undertaken a foundation year of study were more likely to achieve academic success on the subsequent Principles of Economics course. McKenzie and Schweitzer [17] also studied the academic, psychosocial, cognitive, and demographic predictors of the academic performance of first-year Australian university students. They further found that previous academic performances were identified as the most significant predictor of university performance.

### 1.4. Family Income and Education Background

Some researchers have recognized that the broadening dispersion in the family level of income and wealth is widening the ability gap between students. A few studies have investigated the correlation between the family background and subsequent academic performance of students. For instance, Graetz [18] suggested that the academic attainment of students is heavily dependent on the social status of their parents in the society. Similarly, Considine and Zappala [19] argued that parental income and social status can influence student performance. Furthermore, Humble and Dixon [20] confirmed that family wealth factors are positively associated with reading test scores and negatively associated with mathematics test scores. This finding may suggest that the effects of background factors depend on the study area of students. Contrarily, Hanushek et al. [21] concluded that any increase in the disparities in wealth, earnings, and income that may have occurred over the past half century do not translate into an increased connection between the family backgrounds of students and their achievement levels in adolescence.

Fields [2] reported that students can have a greater risk of not completing their degrees when the highest achieved education degree of their parents is a high school diploma. This study highlights a link between student performance and parental education level. Three facets are considered beneficial to the academic attainment of students in the latter study. They are parental participation in the educational program, knowledge of educational needs and goals, and an optimistic view of the future of their child. In Indonesia, Suryadarma et al. [22] discussed that parental education level can have a strong impact on the academic performance of students. Owens [23] equally expressed that the higher the level of academic achievement by the parent, the higher the achievement of the child. In Pakistan, Hijaz and Naqvi [24] went even further and suggested that maternal education level is the true predictor of the academic performance of students.

### 1.5. Religion

Religion can be a key component of academic achievements, especially for Saudi students. Faith is a common integral part of a day-to-day life for many individuals, e.g., individuals must pray five times per day in a mosque (place for praying in each area; commonly, in most cities, each prayer takes nearly 10 min). Consequently, religion can be linked to several daily religious activities performed by students. Springsteen [25] said, "Having an extremely culturally-competent teacher is essential to the positive intellectual growth of the students". Therefore, foreign teachers must be culturally sensitive to students to advance learning outcomes. Religion is equally pertinent when comparing the performance of students who are members of minority groupings to that of majority groupings.

Carpenter et al. [26] also corroborated that minority students performed at a lower level in a study of accountancy, and this effect was partially attributed to “lower performance expectations”. Cole and Ahmadi [27] investigated whether or not the religious preference of Islam (being a Muslim) had a significant influence on the academic achievement of students. They also compared Muslim, Jewish, and Christian students.

#### *1.6. Lifestyle and Extracurricular Activities*

Al Shawwa et al. [28] studied medical students in Saudi Arabia and found no significant correlation between student time spent on personal hobbies and/or extracurricular activities and academic performance. Notwithstanding, the study found that spending more time on social networking was strongly correlated with reduced student performance. Salem et al. [29] examined factors such as the students’ demographic data, motivation, educational factors, and socio-cultural factors, and identified whether these factors affect the academic performance of undergraduate medical students in Saudi Arabia. They found that academic performance was significantly affected by factors such as gender, marital status, interest and motivation, and the transportation used. Al-Ansari et al. [4] verified that how students perceive the relationship between extracurricular activities and their academic studies can affect actual participation in such activities. Additionally, a majority of the sample (345 dental students) participants were dissatisfied with school organized extracurricular activities. By contrast, Wooten [30] demonstrated that extracurricular activities and work responsibilities do not necessarily have a significant impact on motivation nor student performance. Similarly, Principe [1] asserted that external classroom factors did not have a statistically significant impact on student performance. Contrarily, Baker [31] and Derous and Ryan [32] confirmed the positive association between extracurricular activities—social networking aside—and academic achievement. Glass et al. [33] found that among Chinese university students, those who reported using social networking sites excessively were more likely to have lower academic performance. Alkhateeb [34] claims that there is positive affect of the social media platforms on the academic achievement in terms of the usage, especially if it considered as a learning tool.

#### *1.7. Personality*

Several studies have investigated how certain personality traits translate into improved examination performance. Kappe and van der Flier [35] noted that 33% of the variance in GPA scores could be attributed to a combination of intelligence, personality, and motivational predictors. Specifically, those with “conscientiousness” (characterized by being more organized and exhibiting greater perseverance) performed better than their less conscientious counterparts. Conscientiousness was actually singled out as the most influential predictor of academic achievement that explained 22% of the variance in GPAs. Ayala and Manzano [36] investigated the relationship between the dimensions of resilience, engagement, and the academic performance of first-year university students. They also found that the two dimensions of resilience (hardiness and resourcefulness) and the two dimensions of engagement (dedication and absorption) can predict the academic performance of students.

#### *1.8. Nutrition and Health*

Generally, it has been claimed that nutrition affects humans in different aspects, e.g., physical and energy, cognitive increase, and physical effort with capacity growth. Good nutrition is particularly crucial for students, as in the absence of parental influence, poor sleeping habits often lead to a higher frequency of searching for convenient (i.e., fast and easy to cook) and less healthy food options Deliens et al. [37]. Nutrition, or lack thereof, is a major concern that can affect all aspects of one’s life, including student achievements. Nutrition problems can be sensed by common obesity among students, and food insecurity in many regions of the world is present and can affect students. Likewise, it was reported that 10% of U.S. households with children encountered food insecurity in 2012 [38].

Additionally, deficiencies in nutrition can impact the thinking, concentration, behavior, and overall health of students. Belot and James [39] conducted a study assessing the test scores of students who took part in a campaign banning junk food against those who did not. It was found that the students who scored higher were from the group who were eating healthier food.

In Saudi Arabia, university students probably are less pressured to consume these types of food because they benefit from an allowance provided by their university and the students typically remain financially cared for by their families until graduation [28]. Elsayead and Said [40] found clearly that there is a positive connection between nutrition status and student achievement in Saudi Arabia. Most studies have confirmed that there is a relationship between body health and student achievements.

Nevertheless, nutrition is not the only concern—general wellness and health are equally essential. Brown et al. [41] discussed the effect of illness on the absence frequency of students. Student attendance is an evident factor that can increase student performance, which means that students with chronic illnesses are more likely to experience reduced performance.

### *1.9. Motivation*

Motivation is undeniably a key factor in terms of determining the academic performance of a student. A student who is highly motivated to achieve an academic goal is much more likely to achieve a higher level of success than a student with a low level of motivation. Evidently, other factors will come into play, and there is a chance that a highly motivated student, despite his/her intentions and focus, is unable to achieve high levels of academic performance due to learning disabilities. However, highly motivated students are commonly successful.

Al-Shawwa et al. [28] validated that among medical students in Saudi Arabia, across a host of determinants, motivational factors are the most significant factors affecting student performance: “strong motivation for achievement and a clear goal will positively affect the GPA”. Similarly, Rhodd et al. [16] reported a strong correlation between motivation and student performance. Using a sample of 184 first-year university students, Bailey and Phillips [42] found that the lack of motivation is significantly associated with depression and anxiety. The lack of motivation can also be associated with lower academic performance and reduced self-esteem [43].

### *1.10. Summary of Factor Review and Objective of the Study*

On the basis of the previous discussion and according to constructivism theory associated with factors that affect student achievements, the prior experiences of students will commonly have an impact on future performance, especially in education learning.

Additionally, there is a mix of internal and external factors that can influence the academic performance of students (as measured by GPA). This endorses the notion expressed by Mlambo [44] that context-specific research should be undertaken to address pedagogical factors impeding student performance. This highlights that findings might be restricted to the context they have been observed in. A review of the literature on this topic illustrates that a wide range of factors can contribute to the academic performance of students. There is no single factor standing out as a lesser or more important determinant than the others. Observing one determinant in isolation might be too limiting to provide a comprehensive understanding. Hence, creating a comprehensive assessment that includes the potential of key factors is critical. More focus should be placed on the factors that are within the control of students and/or educators.

The current study aims to examine the most prominent factors that potentially affect the academic performance of undergraduate students in Saudi Arabia. Examining the hypothesized prominent factors is important given that the Saudi context can have special characteristics (e.g., religion and culture). Such characteristics can change common findings in the literature regarding the effects of the tested factors. Relating those factors with

constructivism theory assists parents and education policy makers to address the factors that impact students' learning so that their learning outcome is improved.

## 2. Methodology

A survey was emailed to a subset of undergraduate students of four major Saudi Arabian universities, listed in Table 1. The targeted sample was composed of those who have completed the first two years of their bachelor's degree. Two universities are located in Riyadh City: King Saud University (KSU) and Princes Nourah University (PNU). King Abdulaziz University (KAU) and King Fahd University of Petroleum and Minerals (KFUPM) are located in Jeddah and Dhahran cities, respectively. A total of 3565 participants completed the survey, with a response rate of 1.2%.

**Table 1.** Summary of universities selected for data collection.

University	Year of Establishment	Location	Colleges			Number of All Students (M/F)	
			Humanities and Social Sciences	Scientific	Health		
King Saud University	(KSU)	1957	Riyadh	8	6	6	60,936
King Fahd University for Petroleum and Minerals	(KFUPM)	1975	Dhahran	0	7	0	11,568
King Abdulaziz University	(KAU)	1976	Jeddah	9	13	5	176,187
Princess Nora bint Abdul Rahman University (female)	(PNU)	2010	Riyadh	8	4	4	46,935

Consistent with the indicated objective, the survey was designed to be comprehensive and included all potential factors that could affect the academic performance of students in Saudi Arabia. Total of 32 factors were examined in the study. The factors were divided into groups to simplify the description and interpretation of the results. For example, Table 2 lists gender, university, and college factors. The students responded on the basis of their perceptions of the choices. The available responses to each factor were determined on the basis of best judgment and expertise of the authors. The noted tables illustrate the responses of the students to each factor. For instance, Table 2 indicates that a total of 1806 students reported that they are males. Out of the 1806, a total of 457 students reported that their GPA is low (less than 3.5).

In the survey, the students were required to choose a category that describes their academic performance (as defined by their current GPA). As shown below, there were three GPA classifications: High ( $4.25 \leq \text{GPA} \leq 5$ ), Middle ( $3.5 \leq \text{GPA} < 4.25$ ), and Low ( $\text{GPA} < 3.5$ ).

A parameter, Outstanding %, to highlight outstanding percentage was defined to be the ratio between the outstanding respondents who obtained GPA in the High category over the total respondents in each factor. For instance, 67% of the female respondents reported an outstanding GPA compared with only 35.7% of the male students (Table 2).

Chi-square tests were employed to statistically examine if there was a relationship between the reported academic performance (RAP) and each of the 32 factors of interest (e.g., gender). The Bonferroni method was also employed to control for type 1 error rates in these multiple comparisons. Therefore, the relationships were considered statistically significant at the  $p$  value  $< 0.0015$  level. When requirements were violated, Fisher's exact test was used.

**Table 2.** Summary results for gender, university, and college factors. A bold  $p$  value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	$p$ Value
Gender	Male	645	704	457	1806	35.7	<b>&lt;0.0001</b>
	Female	1179	437	143	1759	67.0	
University	KSU	1266	669	281	2216	57.1	<b>0.0004</b>
	KAU	266	172	110	548	48.5	
	KFUPM	238	266	193	697	34.2	
	PNU	36	22	9	67	53.7	
College	Engineering	312	256	160	728	42.9	<b>0.0004</b>
	Computer and Information Sciences	217	141	69	427	50.8	
	College of Medicine	38	13	3	54	70.4	
	Dentistry	14	8	1	23	60.9	
	Pharmacy	37	22	4	63	58.7	
	Applied Medical Science	124	34	10	168	73.8	
	Architecture and Planning	4	9	9	22	18.2	
	Business Administration	297	195	73	565	52.6	
	Sciences	11	9	9	29	37.9	
	Food and Agricultural Sciences	155	98	56	309	50.2	
	Law and Political Sciences	81	35	8	124	65.3	
	Arts	118	93	70	281	42	
	Education	141	58	23	222	63.5	
	Nursing	24	11	2	37	64.9	
	Languages and Translation	66	22	7	95	69.5	
	Preparatory year	73	49	38	160	45.6	
	Others	70	60	46	176	39.8	

### 3. Results

#### 3.1. Gender, College, and University Factors

Gender was significantly associated with the RAP ( $X^2 = 382.59$ ,  $df = 2$ ,  $p < 0.0001$ ), with females reporting higher academic performance than males. The university of the respondent factor was significantly associated with his/her RAP ( $p = 0.0004$ ). Particularly, the respondents from KSU and PNU reported the highest academic performance. The college of the respondent factor was significantly associated with his/her RAP ( $p = 0.0004$ ). Specifically, the respondents from colleges of Medicine, Medical Sciences, Languages, and Translation appeared to report higher academic performance, while the lowest RAP occurred for the Agriculture, Tourism, and Architecture, and Planning colleges.

#### 3.2. Personal Factors

Table 3 shows the results for selected personal factors. Whether or not the students maintain prayers in the mosque was also significantly associated with the RAP ( $X^2 = 422.77$ ,  $df = 8$ ,  $p < 0.0001$ ). Students who performed all or all except for *Alfajer* prayer (Morning prayer) in the mosque reported higher academic performance than those who did not pray or infrequently pray at the mosque. Students who performed all prayers, except for *Alfajer*, reported slightly higher academic performance compared with those who performed all prayers there. Involvement in extracurricular activities was significantly associated with the RAP ( $X^2 = 21.618$ ,  $df = 2$ ,  $p < 0.0001$ ). Particularly, involvement in these activities was associated with higher RAP. Whether or not the students eat breakfast was significantly associated with the RAP ( $X^2 = 16.986$ ,  $df = 2$ ,  $p = 0.0002$ ). That is, students who eat breakfast reported higher academic performance.

**Table 3.** Summary results for selected personal factors. A bold *p* value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Praying in the mosque (Male only)	Yes, all	171	156	96	423	40.4	<b>&lt;0.0001</b>
	All but <i>Alfajer</i> <sup>1</sup>	136	137	57	330	41.2	
	Sometimes	243	320	235	798	30.5	
	No	70	74	63	207	33.8	
Extracurricular activities	Yes	899	472	205	1576	57	<b>&lt;0.0001</b>
	No	836	628	230	1694	49.4	
Eating breakfast	Yes	1059	601	306	1966	53.9	<b>0.0002</b>
	No	679	499	272	1450	46.8	

<sup>1</sup> *Alfajer* prayer is the morning prayer.

### 3.3. Parents Education, Work Field, and Financial Status

Table 4 shows that paternal academic degree was significantly associated with the student RAP (X-squared = 36.21, *df* = 14, *p* = 0.0009). Specifically, having a father with a Ph.D. degree was associated with the highest RAP, which was followed by master, bachelor, and elementary schools (there was comparable RAP among these three degrees). The other categories also had comparable RAPs. The area of paternal degree was not significantly associated with the student RAP (X-squared = 22.08, *df* = 8, *p* = 0.0047). The sector in which the father works (or worked before retirement) was significantly associated with the RAP (X-squared = 23.441, *df* = 6, *p* = 0.0007). The highest to the lowest RAP sectors were Business, Government, Private, and Military, respectively.

Maternal academic degree was not significantly associated with the student RAP (X-squared = 17.907, *df* = 14, *p* = 0.2111). The area of maternal degree was not significantly associated with the student RAP (X-squared = 9.5399, *df* = 6, *p* = 0.1454). The sector in which the mother works (or worked before retirement) was not significantly associated with the RAP (X-squared = 12.511, *df* = 6, *p* = 0.0515). Parents living together was not significantly associated with the RAP (X-squared = 6.2916, *df* = 2, *p* = 0.0430). Whether or not the parents continuously follow the student academic status was not significantly associated with the RAP (X-squared = 9.1462, *df* = 4, *p* = 0.0575). The reported family financial status was significantly associated with the RAP (X-squared = 22.632, *df* = 4, *p* = 0.0001). Specifically, there was a positive association between both factors, i.e., improved family financial status was associated with higher RAP. Whether physical punishment by parents was used as a raising method was not significantly associated with the RAP (X-squared = 8.4824, *df* = 2, *p* = 0.0144).

The number of siblings was not significantly associated with the RAP (X-squared = 24.947, *df* = 10, *p* = 0.0054). The rank of the students among their siblings (e.g., oldest or youngest) was not significantly associated with his/her RAP (X-squared = 3.2788, *df* = 4, *p* = 0.5123). The residence was significantly associated with the RAP (X-squared = 66.114, *df* = 6, *p* < 0.0001). Specifically, living with parents and on campus were associated with the highest and lowest RAP, respectively. There were comparable reported performances among the students from the other two living options.

**Table 4.** Summary results for parental education, work field, and financial status factors. A bold *p* value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Paternal education level	Ph.D.	115	55	19	189	60.9	<b>0.0009</b>
	MS	155	82	43	280	55.4	
	BS	553	331	143	1027	53.9	
	Diploma	179	132	75	386	46.4	
	High school	329	224	140	693	47.5	
	Middle school	203	136	85	424	47.9	
	Elementary School	150	102	42	294	51	
	Did not study	108	62	45	215	50.2	
Paternal major	Medicine related	60	30	16	106	56.6	0.0047
	Engineering related	343	191	103	637	53.9	
	Literature and arts	525	358	153	1036	50.7	
	Military	302	226	141	669	45.1	
	No degree	551	316	171	1038	53.1	
Paternal work field	Governmental employee (civil)	794	513	240	1547	51.3	<b>0.0007</b>
	Private sector employee	309	177	108	594	52	
	Business man	364	202	91	657	55.4	
	Military or security forces	318	230	150	698	45.6	
Maternal education	Ph.D.	21	16	2	39	53.9	0.2111
	MS	48	22	14	84	57.1	
	BS	488	296	149	933	52.3	
	Diploma	169	107	48	324	52.2	
	High school	357	236	116	709	50.4	
	Middle school	221	153	84	458	48.3	
	Elementary School	219	161	88	468	46.8	
	Did not study	267	135	90	492	54.3	
Maternal major	Medicine related	44	21	17	82	53.7	0.1454
	Engineering related	122	55	29	206	59.2	
	Literature and arts	606	405	192	1203	50.4	
	No degree	1014	643	350	2007	50.5	
Maternal work field	Governmental employee (civil)	520	353	145	1018	51.1	0.0515
	Private sector employee	66	54	23	143	46.2	
	Business woman	44	28	13	85	51.8	
	House wife	1160	690	410	2260	51.3	
Do parents Live together?	Yes	1659	1020	534	3213	51.6	0.043
	No	129	106	58	293	44	
Do parents follow-up on your study?	Yes	941	576	271	1788	52.6	0.0575
	No	178	111	73	362	49.2	
	Sometimes	675	437	250	1362	49.6	
Family perceived financial status	Rich	168	68	29	265	63.4	<b>0.0001</b>
	Middle-class	1586	1030	541	3157	50.2	
	Low-income	37	27	22	86	43.0	
Physical punishment by parents	Yes	613	407	242	1262	48.6	0.0144
	No	1179	716	351	2246	52.5	
Number of siblings	More than 10	179	162	85	426	42.0	0.0054
	Between 7 and 9	693	416	231	1340	51.7	
	Between 4 and 6	751	447	235	1433	52.4	
	Between 2 and 3	146	92	40	278	52.5	
	1	21	5	2	28	75.0	
	None	3	3	0	6	50.0	

Table 4. Cont.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Student rank among sibling	Oldest	404	282	150	836	48.3	0.5123
	Youngest	232	147	75	454	51.1	
	In between	1153	697	369	2219	52.0	
Residence	On campus	239	231	157	627	38.1	<0.0001
	With parents	1358	802	370	2530	53.7	
	Off campus with roommates	12	6	5	23	52.2	
	Others	179	87	62	328	54.6	

### 3.4. K-12 Education

Whether the respondents attended a pre-school (before the elementary school) or not was not significantly associated with the RAP ( $X^2 = 4.6286$ ,  $df = 2$ ,  $p = 0.0988$ ) (Table 5). The elementary school type was not significantly associated with the RAP ( $X^2 = 22.949$ ,  $df = 8$ ,  $p = 0.0034$ ). However, the intermediate school type was significantly associated with the RAP ( $X^2 = 31.441$ ,  $df = 8$ ,  $p = 0.0001$ ). Particularly, the respondents from international schools and overseas schools reported the highest performance followed by religious schools, while the respondents from public and private schools reported comparable performances. The high school type was significantly associated with the RAP ( $p = 0.0005$ ), while the respondents from public and private schools reported comparable performances. The respondents from religious and international schools reported the highest performance followed by overseas schools. Having a tutor (in the past) was significantly associated with the RAP ( $X^2 = 13.322$ ,  $df = 2$ ,  $p = 0.0013$ ). Specifically, the respondents who reported not having a tutor reported higher academic performance.

**Table 5.** Summary results for factors related to K-12 education. A bold *p* value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Pre-school enrollment	Yes	941	626	301	1868	50.4	0.0988
	No	883	518	304	1705	51.8	
Classification of elementary school	Public	1318	848	455	2621	50.3	0.0034
	Private	318	208	111	637	49.9	
	Religious	118	69	22	209	56.5	
	International	8	1	2	11	72.7	
	Overseas	64	17	11	92	69.6	
Classification of intermediate school	Public	1325	856	467	2648	50	0.0001
	Private	314	205	107	626	50.2	
	Religious	113	66	22	201	56.2	
	International	11	2	3	16	68.8	
	Overseas	59	12	5	76	77.6	
Classification of high school	Public	1188	755	401	2344	50.7	0.0005
	Private	544	370	199	1113	48.9	
	Religious	33	5	0	38	86.8	
	International	14	3	0	17	82.4	
	Overseas	47	10	5	62	75.8	
Sought a tutor in school	Yes	527	393	212	1132	46.6	0.0013
	No	1291	747	393	2431	53.1	

### 3.5. Pre-Undergraduate Degree Credentials

The RAP was significantly associated with the high school GPA ( $X$ -squared = 183.11,  $df = 12$ ,  $p < 0.0001$ ), *Qiyas* score ( $X$ -squared = 203.88,  $df = 12$ ,  $p < 0.0001$ ), and *Tahseli* score ( $X$ -squared = 241.26,  $df = 12$ ,  $p < 0.0001$ ) (Table 6). More specifically, there was a positive association between the RAP and each of the three metrics.

**Table 6.** Summary results for factors related to the prior application to undergraduate degree credentials. A bold  $p$  value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	$p$ Value
High school graduation score	95–100%	1401	719	312	2432	57.6	<b>&lt;0.0001</b>
	90–95%	255	260	152	667	38.2	
	85–90%	79	84	64	227	34.8	
	80–85%	39	39	24	102	38.2	
	75–80%	27	21	26	74	36.5	
	70–75%	15	7	15	37	40.5	
	Less than 70%	6	10	13	29	20.7	
<i>Qiyas</i> test score <sup>1</sup>	95–100%	113	23	8	144	78.5	<b>&lt;0.0001</b>
	90–95%	289	100	51	440	65.7	
	85–90%	372	238	110	720	51.7	
	80–85%	389	262	118	769	50.6	
	75–80%	334	257	111	702	47.6	
	70–75%	194	163	94	451	43	
	Less than 70%	72	85	100	257	28	
<i>Tahseli</i> test score <sup>2</sup>	95–100%	111	25	6	142	78.2	<b>&lt;0.0001</b>
	90–95%	200	58	26	284	70.4	
	85–90%	285	135	63	483	59	
	80–85%	355	193	106	654	54.3	
	75–80%	391	284	117	792	49.4	
	70–75%	219	239	109	567	38.6	
	Less than 70%	169	187	160	516	32.8	

<sup>1</sup> The *Qiyas* test is a general aptitude test given to high school graduates to measure their analytical and deductive skills. It focuses on testing their capacity for learning in general regardless of any specific skill in a certain subject or topic. The test also measures abilities relevant to reading comprehension, recognizing logical relations, solving problems on the basis of basic mathematical notions, and inference skills. <sup>2</sup> The *Tahseli* test is a scholastic achievement admission test. The test covers the general and key concepts in biology, chemistry, physics, mathematics, and English covered in the courses of the last three grades of high school. Questions vary in their focus on knowledge levels. Some questions measure comprehension, while others measure application and inference.

### 3.6. Preparatory Year

The preparatory year reported percentage was significantly associated with the RAP ( $X$ -squared = 1390,  $df = 12$ ,  $p < 0.0001$ ) (Table 7). The respondents with a higher reported preparatory year percentage also reported higher academic performance. How the preparatory year was perceived significantly affected the RAP ( $X$ -squared = 55.011,  $df = 6$ ,  $p < 0.0001$ ). Particularly, the respondents who did not attend this year reported highest academic performance followed by the respondents who were uncertain how beneficial it was. The lowest RAP was for the respondents who did not perceive the year as beneficial. Perceiving the preparatory year as beneficial for the English proficiency of the respondents was significantly associated with the RAP ( $X$ -squared = 52.55,  $df = 8$ ,  $p < 0.0001$ ). More specifically, those who were uncertain if the year was beneficial for their English reported the highest academic performance.

**Table 7.** Summary results for the preparatory year factors. A bold *p* value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Preparatory year GPA	4.75–5	897	181	20	1098	81.7	<b>&lt;0.0001</b>
	4.25–4.75	507	353	101	961	52.8	
	3.75–4.25	136	291	105	532	25.6	
	3.5–3.75	29	127	89	245	11.8	
	3–3.5	20	95	137	252	7.9	
	Less than 3	15	38	101	154	9.7	
	Did not study	201	51	43	295	68.1	
Was the preparatory year useful?	Yes	1231	824	413	2468	49.9	<b>&lt;0.0001</b>
	No	296	218	128	642	46.1	
	Do not know	81	48	21	150	54	
	Did not study	216	53	42	311	69.5	
Did the preparatory year improve your English?	Yes, a lot	652	426	235	1313	49.7	<b>&lt;0.0001</b>
	Yes, not too much	481	306	147	934	51.5	
	Yes, a little	283	235	104	622	45.5	
	No	178	112	73	363	49	
	Do not know	225	63	46	334	67.4	

### 3.7. Social Media Use

The most-used social media application factor was significantly associated with the RAP ( $X^2 = 32.421$ ,  $df = 8$ ,  $p < 0.0001$ ) (Table 8). While comparable results were found between the other applications, the respondents who reported using YouTube more also reported lower academic performance. The number of hours using social media was not significantly associated with the RAP ( $X^2 = 15.879$ ,  $df = 10$ ,  $p = 0.1032$ ).

**Table 8.** Summary results for the social media factors. A bold *p* value indicates a significant relationship between the related factor and the reported academic performance. Outstanding percentage is the highest RAP category divided by the same row total.

Factor	Response	High	Middle	Low	Total	Outstanding %	<i>p</i> Value
Most used social media	Facebook	138	54	36	228	60.5	<b>0.0001</b>
	Snapchat	578	360	193	1131	51.1	
	Twitter	611	421	167	1199	51	
	Instagram	205	121	71	397	51.6	
	YouTube	279	182	133	594	47	
Number of hours spent on social media daily	More than 4 h	648	424	207	1279	50.7	0.1032
	3–4	486	318	139	943	51.5	
	2–3	346	192	133	671	51.6	
	1–2	225	139	88	452	49.8	
	Less than an hour	102	57	27	186	54.8	
	Do not use social media	17	12	10	39	43.6	

## 4. Discussion

This study aims to test the association of 32 diverse factors with the academic performance of undergraduate students in Saudi Arabia. Exploring the effects of these factors in Saudi Arabians particularly is important because education performance determinants can differ depending on the context [44].

In conclusion, the female students outperformed their male counterparts (Table 2). This result is consistent with the results found in other studies [45,46]. Contradicting the general finding here, Felder et al. [47] confirmed that male students outperformed their

female counterparts in engineering courses. Among other potential reasons, the authors of the latter study referred gender differences to match to instructional styles and the perceptions of students of their fit to their field of study.

The tested personal factors were significantly associated with the RAP (Table 3). Generally, only males are required to perform prayers in mosques in Islam. This is the reason why data from males only were collected for this variable (praying in mosques, Table 3). Students who have generally maintained their prayers in the mosques reported slightly higher performance than those who do not. Additionally, those who are keen to eat breakfast and are involved in extracurricular activities also reported higher performance. Personality type differences might explain the findings here. This factor (i.e., personality type) can determine the most appropriate learning style of students and, subsequently, affect education performance [48].

While surprisingly not observed for the mothers, only the students' paternal education level and work field were significantly associated with the RAP (Table 4). Parental involvement in student education can lead to better performance, which was found in a meta-analysis of 52 studies by Jeynes [49]. In the context of Saudi Arabia, the relationship was detected only for the father potentially because he has generally more control over the children's educational affairs in Saudi Arabian culture.

The preparatory year seeks to facilitate transitioning students from high school to university and to fill the gap in skills between the two levels. During this year, students must be equipped with the necessary skills and knowledge required to excel in their desired bachelor's degree. Generally, the results found here support the effectiveness of this year (Table 7), which are also consistent with results found by the study of Knox [50] conducted in a Scottish context.

Pre-undergraduate credentials (high school graduation grade and grades in two standardized university entrance exams) were significantly associated with the RAP (Table 6). Supporting this pattern of results, Staffolani and Bratti [12] highlighted that the earlier academic achievements of students can be the most important determinant for their future education performance.

The types of intermediate and high school factors were also found to be significantly associated with the RAP (Table 5). Consistent in the two factors, the students who have graduated from religious, international, or overseas schools reported higher academic performance than those who have graduated from public or private schools. Moreover, the students who have graduated from the latter two school types reported comparable levels of performance. The education systems in private and public schools follow the same rules and are administrated by the Ministry of Education, and this could be the reason why there are no differences between the performances of those who are graduates of public and private schools. The effect of school type was found in other studies. For instance, Miller and Birch [15] and Anderton [45] asserted that students from government schools performed better than those from non-government schools in studies conducted in Australia.

The most-used social media sites factor was significantly associated with the RAP (Table 8). Among other tested social media sites, the students who reported using Facebook the most also reported higher academic performance (Table 8). Using data from 1165 Malaysian university students, Ainin et al. [51] also argued that Facebook use was also associated with higher reported performance. However, in a meta-analysis study involving data from more than 100 thousand students, Liu et al. [52] found a negative correlation between GPA and social media use. This correlation was found stronger among female students, but the study found a positive correlation with performance in language testing. For the integration of these findings, the effect of social media use on education performance might be moderated by factors such as the demands of the studied major and gender. Fields of study can differ in the types of demands they require from students. Social media use may strengthen (or weaken) certain skills required by a given area of study. Additionally, social media sites can differ in their cognitive demands and required skills.

This may explain the differences between social media sites regarding their relationship with education performance.

## 5. Conclusions

The current study examined the relationship of 32 diverse factors with the reported academic performance among the undergraduate Saudi Arabian students. While many findings were consistent with the findings found in other contexts, the study identified factors that might be unique to the Saudi Arabian context. For instance, while this was not found for the mothers, the students reported that performance was related to paternal credentials (education level and work field, Table 4). Another example is that students who graduated from international schools and overseas schools reported the highest performance, followed by religious schools, while students who graduated from public and private schools reported comparable performances (classification of school, Table 5). In addition, students who reported not having a tutor reported higher academic performance.

In summary, 20 factors were found to have significant relationship with the reported academic performance. Those factors were gender, university, college, praying in mosques, extracurricular activities, eating breakfast, paternal education level, paternal work field, family perceived financial status, residence, classification of intermediate school, classification of high school, tutor in school, high school graduation score, *Qiyas* test score, *Tahseli* test score, preparatory year GPA, preparatory year overall usefulness, improvement of English in preparatory year, and most-used social media platform.

However, 12 factors were not found to have significant relationship with the reported academic performance. Those factors were paternal major, maternal education, maternal major, maternal work field, whether parents live together, parents follow-up on study, physical punishment by parents, number of siblings, rank among sibling, pre-school enrollment, classification of elementary school, and number of hours spent on social media daily. Last, the results from this study can be practically useful for parents, educators, and decision makers to focus on factors that can improve education outcomes.

## 6. Limitations and Future Directions

While this study has highlighted important “correlative” relationships, knowledge of causal relationships might be limited. For instance, the factor of praying in mosques was found to be significantly associated with the RAP. It is possible that because people who pray at the mosque were more diligent, they performed better academically. Another example might be the Ph.D. of the father (recall that we have found father education factor to be associated with the RAP; Table 4). Possibly, Ph.D. holders live in cities that offer better education; therefore, their children reported higher academic performance (i.e., it is not necessarily because of the Ph.D. of their father that they performed better). Moreover, some of the factors that were found significantly associated with the RAP might be correlated (e.g., paternal education level and work field, Table 4). In addition to this, the study was limited to four universities that are in major cities and did not consider universities in rural areas, which have different environments. Further, the study was limited to undergraduate students and have not considered graduate students whom might have different experiences.

In future studies, developing statistical models is crucial to better understand the impact of the factors examined here with the RAP. Additionally, from such models, effect size measures can be calculated to understand how much of the variability in the RAP is explained by each factor. Prioritizing the influential factors based on their impact level is practically important. This prioritization is useful to optimize resources (e.g., money, time, and effort) use. The current study identified factors that should be considered for building such statistical models particularly for the Saudi undergraduate students.

Future work might also consider studying the factors (i.e., RAP and the other factors of interest) as continuous instead of categorical variables. Continuous factors can provide more knowledge and show the shape of the relationship. For instance, the students who

reported themselves to be involved in extracurricular activities also reported higher RAP (Table 3). However, the former factor was a categorical factor with two levels (yes and no). Whether there is a cut-off point beyond which involving such activities can deteriorate performance is unclear.

Future studies can also include deeper analysis on, for example, why students who studied in private and public schools have comparable academic performance while students who studied in religious, international, or overseas schools reported higher academic performance. Such in-depth analysis can help educators and decision makers improve the education outcome of public and private schools.

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