

**Demographic and Individual Determinants of Academic Achievement of the Students in 9th Grade****Niaz Ahmad¹, Mamoon Mushtaq², Amber Mubeen³, Rabia Jameel⁴****Abstract**

The current research was carried out to explore the relationship of demographic variables with academic achievement in boys and girls using 1000 students (boys = 500, girls = 500) with age range 13 to 16 years ($M = 13.87$, $SD = 1.73$) of 9th grade using stratified random sampling technique from different public high schools. A valid achievement test was prepared to measure academic achievement. Descriptive statistics, correlation, regression analysis, and independent samples t-test were carried out for data analyses. The findings suggest that academic achievement has a significant positive correlation with demographic variables of gender, father's education, and profession, mother's education and profession, monthly income, and study hours. Gender, parental education, and monthly income of family turned out to be the significant predictors of the academic achievement of 9th grade students. Girls outperformed boy's academic achievement on all subjects except mathematics in grade 9.

Keywords: Academic Achievement, Demographic Determinants, Individual Determinants, Income, Gender

1. Introduction

Academic achievement is explained as knowledge achieved or skills developed in the school subjects, usually obtained by test scores, by marks assigned by a teacher or by both (Eder, 2018). Academic achievement is closely related to learning more than one subject at one time (Domjan & Grua, 2003). Achievement, primarily in the academic setting is called academic achievement. Academic achievement also refers to the achievement of objectives described in the curriculum of an educational program. Academic achievement is necessarily positive regarding the objectives of the study, intentional and outcome of an instructional program. Academic achievement is necessary not only to students and parents but also to institutions, educationists, and any progressive nation and other stakeholders (Thapa et al., 2013). Educationists and psychologists have long been concerned with the variables that support positive academic achievement in children (Foster, 2002). Research evidence supports that academic achievement is affected by many environmental variables such as class size, quality of teachers, teacher's proficiency in the subject, facilities provided by the school, and school size (Freiberg, 1998; Kupermin, Leadbeater, & Blatt, 2001). Educational institutions try to organize, arrange, and control these factors to improve the students' academic achievement (Cunningham, 1975). The quality of students' academic performance is influenced by a wide range of environmental, cultural, and psychological factors such as motivation and personality. It cannot be attributed to a single variable (Ukpong & George, 2013).

Academic achievement, competition among students and their success is generally considered as an outcome of the educational program of school which sometimes may not portray an actual picture. There are many other variables also which take part in the achievement which include individual variables like physical and psychological health, intelligence, previous knowledge, study hours, and personality characteristics of the students. Family variables such as parents' education and profession, parents' monthly income, family size, weekly pocket money, and the number of siblings may have a significant impact upon academic achievement (Manning & Saddlemire, 1996). Moreover, accesses to media and opportunities for taking part in social and cultural activities also contribute to academic achievement. Individual factors are uncontrollable for an academic institution. However, some of the individual variables such as physical health and psychological problems can be controlled to some extent with the collaboration of an educational institution with physicians, psychologists, student counselors, and students' parents. The individual variables are also essential to be considered by an institution while developing and operating an instructional program. They are important because even on the same level and with the same conditions and teachers different students may have different levels of academic achievement. Research shows that individual differences affect the academic achievement of students. The main individual differences which can affect academic achievement are; age, gender, birth order, achievement motivation, and personality characteristics.

Age is often considered a strong factor that determines the academic achievement of a student. From a developmental perspective, a certain level of maturity is required for learning certain cognitive skills; a child is unable to learn some cognitive skills before a certain age level is attained. So the age and academic achievement of a student are directly related; that means if all other factors are equal, older students will achieve more as compared to the younger ones. It means that students tend to become more capable of academic achievement as they grow up to a certain level of age. Gender is another significant individual variable that can affect students' academic achievement (Chubb, Fertman & Ross, 1997; Sajid & Ali, 2018; Senturk & Ali, 2021). Many studies

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showed the influence of gender on academic achievements; however, it is not clear whether boys are better than girls or girls are superior to boys. Some research findings show that boys perform better in certain academic areas such as Mathematics. It is reported that the mathematics achievement of boys is significantly better than girls (Hyde, Fennema, & Lamon, 1990). It is also established that boys perform better as compared to girls in high schools (Maqsd & Rouhani, 1991). Many research findings say that girls are ahead of boys in various fields of academic achievement, especially in languages (Marsh, Trautwein, Ludtke, Köller, & Baumert, 2005). Skaalvik (1990) reports that girls' performance is significantly better as compared to boys in both English and Norwegian language achievements. A possible interpretation is that performance in mathematics requires repeated practice that may cancel out the gender differences which are expected to be found in pure Mathematics achievement, whereas performance in languages is more independent of math ability; so the differences in verbal performance are quite visible. It is reported that girl's students were more likely to achieve greater Grade Point Average (GPA) as compared to boy's students (Strahan, 2003; Rousset et al., 2021). It is reported that the better performance of girls than boys is the fact that girls have greater study motivation as compared to boys. Pecjak and Peklaj (2006) reported that 3rd and 7th grade Slovene girls showed better results than boys in reading. Su and Chen (2007) have reported that girls showed higher achievement motivation as compared to boys in secondary classes. Study time refers to the time devoted by a student to himself/herself only to study to seek knowledge. It means to study by removing all distracters like switching off television and radio and mobile phones and other attractive gadgets (Ukpong & George, 2013). Study time is an exercise that goes beyond only reading for pleasure purpose (Adeyemo, (2005).

Parental support is considered an important factor in academic achievement. Parental education and occupation determine the socio-economic status of the family. The parents, who help children in their homework assignments, discuss school matters, reward excellent performance, and buy books or games that were found positively correlated with the academic achievement of their children (Wang & Wildman, 1995). In another study parental home-based type involvement was found to be positively correlated with academic achievement compared with school-based involvement (Hickman, Greenwood, & Miller, 1995; Marc & Ali, 2016). The family continues to intervene and affect student's learning even through the last year of high school (Simon, 2001). What the student learns at home and how the family motivates him/her towards education contributes to the child's success in school (Essien, 2002). Family variables such as socioeconomic level of family, family size, and parents' education are also established risk factors to academic achievement. Socioeconomic status (SES) of the family has a close relationship with the academic achievement of students (McLoyd, 1998). It is reported that socially, educationally and economically strong parents encourage a higher level of achievement and exert a positive effect on the academic achievement of their children (Coleman et al., 1966; McLoyd, 1998). Monthly income is reported to be positively related to self-concept and academic performance in English and Mathematics (Maqsd & Ruhani, 1991). Similarly, the positive effect of parents' income and education on students' academic achievement in Hispanic children is concluded (Ryabov & Hook, 2007).

The confluence model by Zajonc (1977) elucidates the effect of birth order and family size on the intelligence of a child and concludes that firstborn child enjoys a somewhat richer intellectual home environment. Moreover, the firstborn child finds an additional chance to educate the younger children, which makes him or her more confident in comparison to younger children. This accounts for a lower IQ level of younger children. The model further explains that the IQ level decreases with the increase in family size (Zajonc, 2006). Murphy, Stosny, and Morrel, (2005) offer a simple explanation for the higher IQ scores of firstborn children and explains that parental income is limited which they try to spend for the firstborn child. When numbers of children increase the family income is divided among them and each child receives a smaller amount of income from parents.

1.1. Significance of the Study

Academic achievement is a major concern and chief agenda in any educational institution. Academic progress plays a vital role in the future development of a country. Therefore, every country invests a handsome amount in the progress of its educational system and demands a high standard of education in the response of that. School education is a fundamental step in the road of academic success in the future (Hayat, 1998). It paved the way for its students to combat with and meet the required standards of education in future life. Research work in school students is not up to the mark. Therefore, the need is to closely observe the factors enhancing or boosting academic achievement. Academic achievement is affected by many environmental and individual factors (Mehmood, 2006). So, it is vital to have a clear perception of the factors by parents, teachers, and educational administrators for the further improvement and effectiveness of an educational system. Understanding these problems is not possible without conducting research work in an educational environment. A lot of research work has been done in America, the West, and China to explore various aspects of academic achievement (Gay, 1996; Marc & Ali, 2017). Resultantly much concern is being expressed over the continuous poor academic performance of students in Pakistan, particularly of secondary school students. The resources include money, personal attention, and cultural objects such as books. Therefore, the current research was conducted to explore the correlation of various dimensions of academic achievement with demographic variables.

1.2. Hypotheses of the Study

The following hypotheses were generated for the study.

- There is a relationship between demographic variables and the academic achievement of students.
- Demographic variables like parent's education and profession and monthly income will be significant predictors of academic achievement in different subjects of students.
- Girls would attain more scores in the subjects of English, Urdu, science, social studies, and Islamyat as opposed to mathematics where boys would score high than girls.

2. Method

2.1. Participants

It was a survey research design. A total sample of 1000 students (boys = 551, girls = 449) was taken from different schools of Lahore. Their age was ranged from 14-17 years ($M = 14.55$, $SD = 1.38$). They were the students of grade 9th.

Table 1: Demographic Characteristics of the Students (N = 1000)

Variable	<i>f</i>	%	Variable	<i>F</i>	%
Gender			Mother's education		
Boys	549	54.90	Below Matric.	610	61.00
Girls	451	45.10	Matriculation	130	13.00
No Sibling			Intermediate	80	8.00
1-3	180	18.00	Graduation	100	10.00
4-6	557	55.70	Post graduation	24	2.40
7-9	200	20.0	Not mentioned	56	5.60
10-12	23	2.30	Mother's profession		
Father' education			Housewife	881	88.1
Below Matric	480	48.00	Employment	68	6.80
Matriculation	184	18.40	Not mentioned	49	4.90
Intermediate	97	09.70	Father's profession		
Graduation	104	10.40	Employment	467	46.70
Post graduation	110	11.00	Business	216	21.60
Not mentioned	25	2.50	Agriculture	280	28.00
			Not mentioned	40	04.00

Note: *f* = frequency; % = percentage; matric = matriculation

2.2. Procedure

Initially, the names of schools were entered in a notebook after obtaining the lists of schools of Lahore city from the office of Director Public Instruction (DPI) Punjab and included in the sample. Some students of Master classes of Psychology were trained for test administration and to aid the researchers. All of the tools were administered in one session from one school. The data were collected immediately after the start of the new academic year.

A lecture was given regarding the importance of this research and all participants were informed about the purpose of the study. They were also informed that their responses would be kept strictly confidential and will be used only for research. They were encouraged to be honest and frank in their responses and to respond to all items. The instructions were read out and the students were asked to give their responses according to the instructions. The researchers and their trained research allies gave details to the participants verbally.

3. Measures

3.1. Demographic Questionnaire

A demographic questionnaire was prepared and administered regarding the information of age, birth order, no of siblings, father's education, father's profession, mother's education, mother's profession, monthly income of family and study hours, etc.

3.2. Comprehensive Academic Achievement Test for 9th-Grade Students

Academic achievement of the students was assessed by a locally developed comprehensive achievement test. This was constructed comprising information from all compulsory subjects in grade 9th. The test was prepared and duly validated for this purpose. A table of the specification was prepared before the development of the test; it was planned that the test would include 17 items from the subjects of English, mathematics, science, Urdu, Islamic studies, and social studies. The original test was developed and consisted of 102 items.

Initially, the test was administered to 50 students (boys = 25, girls = 25) from the Ninth class of 2 public schools. Based on students' responses, item analysis was carried out for each item of the test. The items having difficulty level between the recommended range of difficulty and discrimination level were retained in the test. All other items were either improved or replaced with new items. The response options which were not working well were also improved or replaced with new options. A total of 30 items were improved or replaced in this way. The new version of the test was again administered to a new sample of 9th graders of the same school and all the items were found fit to be retained in the test.

3.3. Statistical Analyses

Descriptive statistics were used to calculate personal information of respondents like gender, age, parents' education level, no of siblings, monthly income of the family (Table 1). To make sure the reliability of tools, we carried out reliability analyses for the comprehensive achievement test of the study. Then correlation analysis was run to address our first hypothesis of the study and calculated correlations among demographic variables and academic achievement of students. Afterward, we utilized multiple regression analyses to address the 2nd hypothesis of the study that demographic variables are predictors of the academic achievement of students. Independent samples t-test to examine the difference between subjects in the academic achievement of boys and girls.

Table 2: Correlation of Demographic Variables with the Academic Achievement of Students (n = 1000)

Variable	M	SD	AA	Variable	M	SD	AA
Age	14.46	1.38	.13**	No. of siblings	-	-	.16**
Father's education	2.12	1.40	.18***	Birth order	3.92	1.67	.09*
Father's profession	2.31	1.40	.14**	Class Size	50	21.29	.11*
Mother's education	1.65	1.21	.28***	Marks of 8 th	495.40	100	.19***
Mother's profession	1.53	1.09	.20***	Study hours	4.30	1.78	.33***
Monthly income	27166	2120	.19***	Pocket money	292.50	25.29	-.23***

Note; AA = academic achievement; * = $p < .05$; ** = $p < .01$; *** = $p < .001$

As shown in Table 2 that there is significant relationship of age (.13, ** $p < .01$), father's education (.18, *** $p < .001$), and profession (.14, ** $p < .01$), mother's education (.28, *** $p < .001$), and profession (.20, *** $p < .001$), monthly income (.19, *** $p < .001$), no. of siblings (.16, ** $p < .01$), birth order (.09, * $p < .05$), class size (.11, * $p < .05$), marks of 8th class (.19, *** $p < .001$), study hours (.33, *** $p < .01$), and weekly pocket money with academic achievement of students.

Table 3: Demographic Variables Predicting Academic achievement of Students (n = 1000)

Variable	B	SEB	β	t- value	95%	CI
(Constant)	22.55**	7.99		2.82	289.44	322.26
Gender	11.94***	1.26	.31	9.46	2.44	9.46
Father's education	.53***	.55	.04	.96	-2.25	-1.02
Father's profession	.44***	.23	.02	.89	1.22	1.67
Mother's Education	1.47**	.64	.10	2.28	-1.99	2.19
Monthly income	30710.70***	.84	.00	.12	.000	.000
Study hours	.74***	.12	.30	7.61	-.80	.22
Mother's profession	.43***	.06	.23	6.29	-.74	-.30

Table 3 shows the results of regression analysis in which four variables are statistically significant. Regression coefficients of gender ($B = 11.94^{***}$), father's education ($B = .53^{***}$), father's profession ($B = .44^{***}$), mother education ($B = 1.47^{**}$), monthly income ($B = 30710.70^{***}$), study hours ($B = .74^{***}$) and mother's profession ($B = .43^{***}$) have positive effect on overall academic achievement of students.

Table 4: Effect of Demographic Variables on the Urdu and Islamiyat (n = 1000)

Variable	UA			IA		
	B	SEB	β	B	SEB	β
(Constant)	4.65*	1.88		.09	1.92	
Gender	.47***	.24	.22	1.07**	.25	.16
Father's education	.08	.11	.03	-.02	.11	.01
Mother's education	.02	.12	.01	.37**	.13	.13
Monthly income	30130.06*	.00	.06	29030.60*	.00	.09
Mother's profession	.21***	.02	.38	.15***	.02	.27
Study hours	.16***	.01	-.21	-.02*	.01	-.09

Note; UA = Urdu achievement, IA = Islamiyat achievement

Regression analysis was carried out to examine the predictors in the subjects of Urdu and Islamiyat of students. Table 4 shows that regression coefficients of gender ($B = .47^{***}$), monthly income ($B = 30130.06^*$), mother's profession ($B = .21^{***}$) and study hours ($B = .16^{***}$) are significantly predicting academic achievement of students in the subject of Urdu. Table 4 also shows the results of regression analysis in which regression coefficients of

gender ($B = 1.07^{***}$), mother's education ($B = .37^{***}$), and monthly income ($B = 29030.60^{***}$) are significantly predicting academic achievement of Islamiat.

Table 5: Demographic Variables Predicting Academic Achievement of Science and Social Studies

Variable	Science			SSA		
	<i>B</i>	SEB	β	<i>B</i>	SEB	β
(Constant)	.573	1.21		.25	2.17	
Gender	.67 ^{***}	.15	.385	.33 ^{***}	.28	.31
Age	.10 [*]	.06	.060	.11	.11	.03
Father's education	.07 [*]	.07	.05	.01	.001	.038
Mother's education					.128	.049
Monthly income	.24 ^{**}	.08	.02	.12		
	2.34E06 ^{***}	.00	.12	2.943E.06 ^{***}	.00	.10

SSA = social studies achievement

Table 5 shows the results of regression analysis in which regression coefficients of gender ($B = 67^{***}$), age ($B = .10^*$), father's education ($B = .07^*$), mother's education ($B = .24^{***}$) and monthly income ($B = 2.340E06^{***}$), are significantly predicting academic achievement of science and social studies of students.

Table 6: Effect of Demographic Variables on Mathematics and English Achievement

Variable	Mathematics			English		
	<i>B</i>	SEB	β	<i>B</i>	SEB	β
(Constant)	3.27	1.88		6.42 ^{**}	2.15	
Gender	1.78 ^{***}	.24	.03	1.67 ^{***}	.28	.26
Father's education	.13 ^{**}	.09	.01	.24 ^{***}	.12	.09
Mother's education	.17 ^{**}	.07	.070	.18 ^{**}	.07	.02

Table 6 shows the results of regression analysis in which regression coefficients of gender ($B=1.78^{***}$), father's education ($B=.13^{**}$), and mother's education ($B=.18^{**}$) are statistically significant. Gender, father's education, and mother's education have a positive effect on the achievement of mathematics. Table 6 also shows that regression coefficients of gender ($B = 1.67^{***}$), father's education ($B = .24^{***}$) and mother's education ($B = .18^{***}$) are significantly predicting English achievement of students.

Table 7: Effect of Gender on Academic Achievement of Various Subjects (N = 1000)

Variables	Boys ($n= 551$)		Girls ($n= 449$)		<i>t</i> (998)	Cohen's <i>d</i>	C.I	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			<i>LL</i>	<i>UL</i>
Urdu	7.66	3.03	8.12	3.06	-2.15 [*]	.13	1.45	2.87
Islamiat	6.74	3.01	7.06	3.49	-1.53	.09	.08	1.89
Science	3.09	2.0	4.26	2.34	-8.41 ^{***}	.53	-.94	.24
Social study	5.63	3.30	7.30	4.09	-7.01 ^{***}	.44	-5.87	-3.82
Mathematics	7.36	3.08	5.25	3.10	-5.63 ^{***}	.35	-.66	.96
English	7.06	3.49	7.82	4.02	-2.50 [*]	.15	-1.28	.01
Study hours	4.18	2.01	7.78	4.21	3.45 ^{***}	.32	-1.87	.96
AA	2.8958E	24.72	2.9401E	26.19	-2.74	.20	-7.59	-1.26

Note, *t* = *t*-values, Cohen's *d* = effect size, CI = class intervals

Table 7 shows the results of independent samples *t*-test in which gender is the independent variable and academic achievement scores in various subjects are dependent variables. To find out which dependent variables are affected by gender, independent samples *t*-test analysis was carried out. Six variables are significantly affected by gender. *T* values of Urdu ($t = -2.15^*$), science ($t = -8.41^{***}$), social studies ($t = -7.01^{***}$), mathematics ($t = -5.63^{***}$) and English ($t = -2.50^*$) are statistically significant; girls' achievement in all the subjects is significantly higher than boys except that of mathematics. There is no effect of gender on the achievement of Islamiat.

4. Discussion

The present study has sought the relationship of demographic variables with the academic achievement of students. The results indicate the relationship of age, gender, father's education, and profession, mother's education and profession, monthly income, birth order, and study hours with academic achievement is statistically significant. Age is found to have a significant correlation with the academic achievement of students. The findings corroborate with the findings of the earlier study where age is considered an important factor of academic achievement (Agwagah & Harbor-Peter, 1994). It was concluded that students with small age do better than their

peers in English, Mathematics, Science, and overall scores while older students achieved at a higher level than the younger ones (Agwagah & Harbor-Peter, 1994).

The effect of gender on different subjects was determined by applying the t-test and the girls' academic achievement was found high as compared to boys on a comprehensive academic achievement test. However, there was an insignificant difference in the marks obtained in the middle standard examination between boys and girls students. Keeping the fact in view it is not easy to explain the better performance of girls than boys. One possible explanation of the finding is that girls are generally more motivated for education as compared to boys (Su & Chen, 2007). Pecjak and Peklaj (2006) found that girls showed good results than boys in reading motivation. The effect of gender on academic achievement has been studied by many researchers, their findings have some differences; however, most of the research shows girls ahead of the boys in academics (Skalvik, 1990). Boys surpass girls in the subject of mathematics which is supported by the previous literature (Skaalvik, 1990). It is reported that girls were more likely to achieve greater Grade Point Average (GPA) as compared to boys at the university level (Strahan, 2003).

Additionally, parents' education has been found to have a significant impact on the academic achievement of the students. The reason may be that more support and attention is given by more educated parents for their children as compared to less-educated parents. Another reason may be the modeling of parents for their children. Empirical evidence confirms the positive relationship between students' academic achievement and their parents' education (McLoyd, 1998; Ryabov & Hook, 2007). It is established that educated parents remain more involved in the study of their children as compared to uneducated parents (McLoyd, 1998). Monthly family income showed a positive correlation with academic achievement of the students. The parents with more income can afford to spend more on their children's education and resultantly the performance of their children is better as compared to the children of poor parents. The finding also verified the results of other studies (Maqsood & Ruhani, 1991; McLoyd, 1998; Ryabov & Hook, 2007). The relationship between academic achievement and the class size was not significant in the present study. This finding is inconsistent with some of the previous research which shows a negative relationship between academic achievement and school size (Cunningham, 1975). The difference between the previous studies and the present study may be due to the difference in the availability of educational opportunities in our country and advanced countries. In Pakistan, there is a limited number of good educational institutions. Most people try to send their children to a good institution, so the number of students increases in these schools. Resultantly, the academic achievement of such schools is influenced by large class size and the better quality of academic achievement in good schools is canceled out with the large class size.

The children of working women showed a significantly high level of academic achievement as compared to the children of housewives. It may be due to the difference in educational level between their mothers. It is also expected that working women are more independent due to their monthly salary and they provide better facilities and environments which help their children to perform better in academics. It is also supported by literature that parent involvement is considered an important factor that has been constantly linked to a child's increased academic performance (Hill & Craft, 2003).

5. Conclusion

The research contributed to the society about the importance of environmental and individual variables in the promotion of academic achievement of students. The role of parents' education, profession, and family income turned out significant predictors of the academic achievement of students in the present research.

5.1. Recommendations

Parents' education is related to academic achievement so the children having uneducated or less educated parents are at high risk of having a low level of academic achievement; such children should be provided with special care and additional academic support from an educational institution. The curriculum should not portray females as inferior to males in any aspect. Girls should be provided equal opportunities to participate in all of the curricular and co-curricular activities arranged by an institution. The list of demographic variables of the study should be extended. The variables such as the location of the school, the medium of instruction, and the school climate should be included in some other study.

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