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The impact of psychological factors on the academic achievement of urban and rural students in Sichuan, China

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Abstract

Drawing on the persistent urban–rural education gap in Sichuan, this study examines how self-actualization, self-esteem, and basic psychological needs influence university students' academic achievement. A quantitative, descriptive design was employed, utilizing simple random sampling of 400 students from Sichuan universities. Primary data were collected through validated questionnaires; reliability and validity were established (Cronbach's $\alpha \geq 0.70$; KMO ≥ 0.78). The analyses included descriptive statistics, Pearson correlations, and multiple linear regression conducted in IBM SPSS. Results indicate strong overall associations between psychological factors and academic achievement ($R = 0.886$, $R^2 = 0.786$; $p < 0.001$). All three predictors contributed uniquely and significantly to achievement ($p \leq 0.006$), with psychological needs demonstrating the largest standardized effect ($\beta = 0.439$), followed by self-esteem ($\beta = 0.419$) and self-actualization ($\beta = 0.107$). Multicollinearity diagnostics were within acceptable limits (VIF 2.46–2.92; tolerance 0.34–0.41). Demographic profiling showed broad participation across gender, age, residence, and travel distance, enabling comparisons between urban and rural students. The findings suggest that interventions supporting students' basic needs, enhancing self-worth, and fostering growth-oriented goals may lead to measurable academic benefits, especially in resource-constrained rural contexts. Limitations include reliance on self-reports, provincial scope, and unmeasured contextual factors. Future research should test targeted, school-based support programs and monitor long-term outcomes across diverse regions. The implications for policy, teacher training, and resource allocation are also discussed.

Keywords: Academic achievement, Basic psychological needs, Education quality, Self-actualization, Self-Esteem.

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1. Introduction

Mental health is more than simply the lack of mental illness and it also includes the capacity to manage life's challenges. Everyone's mental and physical well-being are equally crucial. Teachers and parents need to focus on the psychological factors of the students to help urban and rural students achieve academically. Improving the psychological condition of the students can improve their academic grades and increase their engagement in education.

The intrinsic desire of a student is to achieve goals and learn innovative things for their academic success. The figure below is depicted in research by Sun [1] shows that high-quality education is an individual right, according to *Sustainable Development Goal 4* of the UN. Achieving proficiency in math and literacy as well as *"acquiring the understanding and abilities necessary for sustainable development"* are the objectives for 2030. In China, *90.8 million* children are enrolled in higher education and *107.5 million* are in elementary school as of 2020.

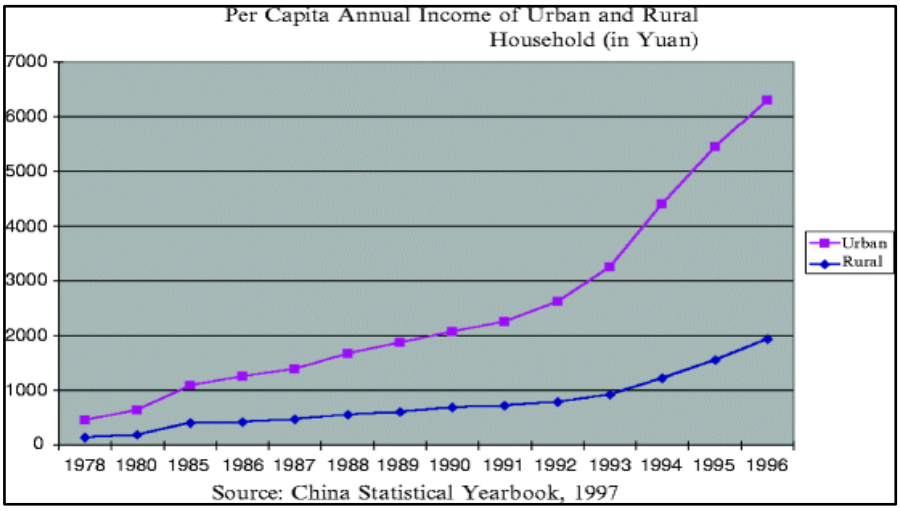

Figure 1.
Education Disparity in Urban/Rural China.
Source: China Statistical Yearbook [2]

Alongside its strong economic expansion, China has emerged as one of the nations with the widest urban-rural divide globally [3]. According to Xiang and Stillwell [4] the conventional approach to reducing this urban-rural divide depends on financial aid to enable rural educational facilities to purchase better supplies, particularly more qualified teachers. However, because excellent metropolitan instructors are sometimes hesitant to move to rural regions, this kind of initiative normally fails.

2. Method

The study incorporated quantitative approaches for collecting data regarding the impact of psychological factors on academic achievement. However, a suitable research design has been selected for choosing the right number of samples from the wide range of population. The researcher used different kinds of methods in this study such as research design, data collection, data analysis, reliability and validity. Using all of these research methods, the researcher can answer all of the research questions, test the hypothesis and identify the theoretical significance in a systematic way.

2.1. Research Design

2.1.1. Nature of Research

The design of the research is mainly identified based on the research questions and objectives, which can be formulated for achieving the goals [5]. A suitable research design is also possible to determine the appropriate data collection and analysis approaches that are to be used for collecting and analyzing information for the study to draw a

relevant conclusion. The research has considered the use of quantitative design for collecting numerical data from the chosen respondents, particularly for the study.

2.1.2. Type of Investigation

The quantitative design is effective in generating responses for testing the hypothesis of the study, which allows for increasing the generalizability of the data collected from the selected samples. The quantitative data is also useful in identifying the underlying relationships and patterns among the variables for hypothesis testing and interpretation of the study [6].

2.1.3. Extent of Researcher Interference

The quantifiable method of collecting data can also be utilized to prove that the hypothesis developed in the study maintains high reliability from the large sample size, which provides accurate and authentic information. It is also effective in generating an explanation of variable relationships to provide a better understanding of the problem statement [7]. The quantitative design has been adopted for maintaining discipline in the complex analysis of collecting and analyzing numerical information.

2.1.4. Research Setting

The descriptive design has been selected by the researcher for conducting the study, which helps describe and explain different information and objectives for the study [8]. The descriptive research design is effective in conducting a study through a systematic approach of observing and collecting data accurately for describing a phenomenon or situation in concern. This design does not attempt to establish a cause-and-effect relationship but focuses primarily on "what" or "where"-related questions about the characteristics of the subject [9].

2.1.5. Unit of Analysis and Time Horizon

The unit of analysis in this study is focused on individual responses from students, particularly the numerical data collected from the participants regarding self-esteem, self-actualization, and psychological needs in relation to student achievement.

2.1.6. Sample design

The concept of population in the research method refers to an entire group of respondents, while sampling is indicated to a specific group of participants [10]. Presently, the total number of students in the Sichuan universities is approximately 2.05 million [11]. However, it is impracticable to involve the entire population in the study as the server respondents. Hence, the Krejcie and Morgan table has been used for selecting the suitable sample size. Concerning the 100,000 population, a sample of 384 is eligible but the population in the Sichuan universities is more than that. Therefore, 400 students from the universities have been selected as the sample for the study. A higher number of samples is being selected for the study since it reduces any errors like sampling bias that affect the overall findings. Many errors like non-response or erroneous data can end up reducing the overall data collected through the sample.

Table for Determining Sample Size of a Known Population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	1000000	384

Note: N is Population Size; S is Sample Size *Source: Krejcie & Morgan, 1970*

Figure 1.
Sample Size Estimation by Krejcie and Morgan [12].

2.1.7. Sampling Method

The simple random sampling technique assists the researcher to provide an equal chance to all of the members in a sampling group and is therefore chosen for this study [13]. It allows to maintain diversity in sampling size and collect data from large percentage respondents without any kind of sampling bias.

2.1.8. Data Collection

Data collection is generally divided into primary and secondary methods, and this study adopts a primary data collection approach [14]. This method involves gathering data directly from specific participants. Primary data collection can be further categorized into quantitative and qualitative techniques, both of which are commonly applied to analyse firsthand data obtained through surveys or interviews [15]. The use of surveys allows researchers to collect measurable data, typically through responses rated on a Likert scale.

One of the main advantages of using questionnaires is their ability to obtain firsthand information directly from participants. These questionnaires often provide a range of response options, generating quantifiable data that facilitates subsequent statistical analysis [16, 17]. Therefore, employing a primary quantitative data collection method is particularly beneficial for this research, which explores the psychological factors influencing academic performance among students in urban and rural areas of Sichuan, China. It ensures that the data gathered is both relevant and reflective of the current context.

2.2. Data Analysis

Using the primary method for quantitative analysis, investigators are able to easily interpret the collected statistical data easily [18]. It allows the researcher to convert raw data into meaningful information that can be used in the study for different purposes [19]. The generated information and data can include graphs and tables based on the statistical and numerical approaches by conducting different tests like descriptive statistical tests, multiple linear regression analysis tests, Pearson correlation, and others using the IBM SPSS software.

Table 1.
Data Analysis Summary Table.

Research Objectives	Research Questions	Hypothesis	Data Analysis Techniques
RO1. To examine the significant impact of self-actualization on student achievement in Sichuan universities	**RQ1.** Does self-actualization in the Sichuan region have a significant impact on student achievement?	H1: Self-actualisation has a significant impact on student achievement of urban and rural students in Sichuan, China	Descriptive Statistical Test, Cronbach Alpha reliability test, Multiple linear regression, Pearson Correlation Coefficient validity test, Hypothesis testing
RO2. To investigate the significant impact of self-esteem on student achievement in Sichuan universities	**RQ2.** What is the significant impact of self-esteem in the Sichuan region on student achievement?	H2: Self-Esteem has a significant impact on student achievement of urban and rural students in Sichuan, China	Descriptive Statistical Test, Cronbach Alpha reliability test, Pearson Correlation Coefficient validity test, Multiple linear regression, Hypothesis testing
RO3. To identify the significant impact of psychological needs on student achievement in Sichuan universities	**RQ3.** What is the significant influence of psychological needs in the Sichuan region on student achievement?	H3: Psychological Needs has a significant impact on student achievement of urban and rural students in Sichuan, China	Descriptive Statistical Test, Cronbach Alpha reliability test, Pearson Correlation Coefficient validity test, Multiple linear regression, Hypothesis testing

2.2.1. Descriptive Analysis

The demographic information revealed that the majority of the participants of the study are female while 40% of the respondents are male. It is also observed that the respondents of the study are aging highly are of the range of 18 - 20 years. Most of the students taking part in this research belong to the urban area. The students are also observed to be sitting that their educational institutes are at a distance within 10 to 100 km for the majority. It is evident from the above information that urban areas students are having a higher interest to take part in the study or have the accessibility towards such participation.

Table 1.
Demographic information.

		Count	Column N %
A1	Male	16	40.0%
	Female	24	60.0%
A2	Less than 18 years	5	12.5%
	18 to 20 years	18	45.0%
	21 to 23 years	13	32.5%
	More than 23 years	4	10.0%
A3	Urban area	28	70.0%
	Rural area	12	30.0%
A4	Less than 10 km	3	7.5%
	10–100 km	19	47.5%
	100–300 km	13	32.5%
	More than 300 km	5	12.5%

2.2.2. Pilot Test

A pilot test is performed to test the reliability and validity of the items that have been selected for the questionnaire. This study is a feasibility test and hence is conducted on 10% of the total population for the study, this study has used 40 individuals as the sample for the pilot test. The reliability analysis of the first variable ensured that the adapted instruments are consistent. The reliability for the other independent variables are also high since the value of Cronbach Alpha is obtained to be more than 0.7 and less than 0.9.

Self-Actualisation (IV1): Internal consistency is prevalent for Self-Actualisation as the Cronbach Value is within 0.7 to 0.9.

Table 2.
Cronbach Alpha Test for Self-Actualisation.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.747	0.692	5

Self-Esteem (IV2): The reliability of the Self-Esteem is high as the value as Cronbach is more than 0.7.

Table 3.
Cronbach Alpha Test for Self-Esteem.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.704	0.706	5

Psychological Needs (IV3): The items for this variable have also ensured consistency as the value is more than 0.7.

Table 4.
Cronbach Alpha Test for Psychological Needs.

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.736	0.736	5

Student Achievement (DV): All the items exhibit good consistency as the value surpasses 0.7, portraying acceptable internal consistency.

Table 5.
Cronbach Alpha Test for Student Achievement

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.828	0.827	5

In order to test the validity of the research, Pearson's Correlation coefficient test was performed. This analysis ensures that there is moderate to low validity if the Pearson's Correlation Coefficient value is within the range of 0.3 to 0.8. Any value above 0.8 would indicate high validity and lower accuracy of the information collected through the selected items. Hence, this ensures that there is appropriate validity in the research and hands the items are effective in utilisation for the study.

Table 7.
Pearson Correlation Coefficient Test.

		B	C	D	E
B	Pearson Correlation	1	0.386*	0.402*	0.415**
	Sig. (2-tailed)		0.014	0.010	0.008
	N	40	40	40	40
C	Pearson Correlation	0.386*	1	0.525**	0.438**
	Sig. (2-tailed)	0.014		0.001	0.005
	N	40	40	40	40
D	Pearson Correlation	0.402*	0.525**	1	0.568**
	Sig. (2-tailed)	0.010	0.001		0.000
	N	40	40	40	40
E	Pearson Correlation	0.415**	0.438**	0.568**	1
	Sig. (2-tailed)	0.008	0.005	0.000	
	N	40	40	40	40

Note: *. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

2.2.3. Inferential Analysis

This analysis can be essential to evaluate the Kurtosis and skewness of the data set. The purpose of conducting normality study is to understand the nature of distribution of the collected data set from the population. Identification of inaccurate p values in the test indicates risk of errors. The type one inaccurate value indicates false positive, and the type 2 value is false negative. Confirmation achieved from this analysis is essential to understand the statistical approaches adopted for the study is appropriate to achieve the required result without affecting the reliability of the variables. For example, the nature of Likert scale is ordinal. However, it is considered as interval data due to the errors in the data set. Normality testing can be helpful to justify the assumption regarding the nature of the scale. The constructs must have a score less than 0.05 to become eligible for supporting the hypothesis.

3. Results

The primary data collected form the students is being assessed to achieve key insights regarding the academic achievement of students. The statistical analysis in this chapter has been carried out employing the IBM SPSS software which furnishes quantifiable data and outlook into the research problem. This section elaborates on the demographic profile of the respondents along with preliminary tests carried out to explore the impact of Self-actualisation, self-esteem and psychological needs. Furthermore, the hypothesis developed in the study have also been evaluated the findings of which are elaborated throughout the following chapter.

3.1. Profile of Respondents

It has been understood that a total 400 participants are responding. Hence, the response rate is 100%. Furthermore, it also means that there is no error in the designed questionnaire, so all of the respondents are able to share their opinion about this research topic.

Table 8.
Profile of Respondents.

		Count	Column N %
Gender	Male	188	47.0%
	Female	212	53.0%
Age	Less than 18 years	12	3.0%
	18 to 20 years	222	55.5%
	21 to 23 years	150	37.5%
	More than 23 years	16	4.0%
Nature of Account	Urban area	176	44.0%
	Rural area	224	56.0%
Distance	Less than 10 km	7	1.8%
	10 to 100 km	242	60.5%
	100 to 300 km	125	31.3%
	More than 300 km	26	6.5%

A detailed information about the profile of response has been represented through Table 8. A total of 400 students are selected as the respondents and their demographic information is collected such as gender, age, nature of account, and distance. The results of Table 8 highlights that a total of 212 (53.0%) female respondents participated in the survey. On the other hand, 188 (47.0%) participants are male who also respond in this survey. The age group of respondents are also measured as it allows the researcher to understand how much the collected data is variable as aged people are more experienced and matured about the given research topic. In this context, it seems that a total of 222 (55.5%) participants are within 18 - 20 years. Similarly, only 12 (3.0%) participants are of less than 18 years, while 16 (4.0%) are of more than 23 years.

The researcher has found out that the majority of students 224 (56.0%) are from rural areas, while 176 (44.0%) are from urban areas. The distance between the home and university of students are also figured out through this profiling test. It has been figured out that a total of 242 (60.5%) students have a distance of 10 to 100 km between their university and home. Furthermore, only 7 (1.8%) respondents have a distance of less than 10 km. The outcome of this response rate helps the researcher to understand whether the psychological factors of students are influenced by their location, distance between home and university, and many more demographic factors.

3.2. Preliminary Test

3.2.1. Factor Analysis - Student Achievement

Table 9.
Factor analysis - Student achievement

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**.787**
Bartlett's Test of Sphericity	Approx. Chi-Square	696.010
	df	10
	Sig.	.000

The KMO and Bartlett's Test is performed in order to determine whether the validity of the variables is appropriate for the study or not. Generally, a KMO value within the range of 0.5 to 0.7 indicates a good value while values above 0.7 or 0.8 indicates a highly suitable value for ensuring validity. In case of the Table 9, the factor analysis of student achievement reflects a KMO value of 0.787. Additionally conducting the Bartlett's Test of Sphericity, the Sig value is obtained to be 0.000. Both these values satisfy the requirements for the analysis hence ensuring the overall adequacy of the sample for the study.

Table 10.
Communalities.

	Initial	**Extraction**
I can apply my knowledge in practice	1.000	0.607
I gained a lot of knowledge from studying.	1.000	0.517
I want to perform well on exams to prove my competence.	1.000	0.653
I want to broaden my knowledge in other domains.	1.000	0.480
I developed many skills while studying.	1.000	0.671

The Table 10 analyses the proportion of variance that is prevalent in each factor of the variable further explained by the extracted components using principal component analysis (PCA). The variance of each item is observed to be 1.000. After the extraction of the components, the values are seen to be ranging from 0.480 to 0.671. The highest value of community is obtained for the item “I developed many skills while studying”, which signifies the strong representation of

the extracted components. Overall, it can be stated that the extraction values display that the selected components are capable of capturing the variance in the items under the dependent variable student achievement.

Table 11.
Total Variance Explained.

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.927	58.545	58.545	2.927	58.545	58.545
2	.767	15.346	73.891			
3	.539	10.775	84.665			
4	.448	8.952	93.618			
5	.319	6.382	100.000			

The total variance explained table above portrays the amount of variance that is prevalent within the items of the dependent variable and the extent to which such variance can affect the findings of the study. It is seen that the first component under the dependent variable has the highest variance at a value of 2.927. This item also contributes towards 58.545% of the total variance in the study.

3.2.2. Factor Analysis - Self-Actualisation, Self-Esteem, Psychological Needs

KMO and Bartlett's Test in statistics is used to measure if a sample is suitable for factor analysis or not.

Table 6.
Factor analysis - Self-actualisation, Self-esteem, Psychological needs.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.894**
Bartlett's Test of Sphericity	Approx. Chi-Square	3206.873
	df	105
	Sig.	0.000

The Kaiser-Meyer-Olkin (KMO) value for sampling adequacy in this study was found to be 0.894, suggesting that the data is well-suited for factor analysis. Additionally, Bartlett's Test of Sphericity yielded a highly significant result ($p < .001$), indicating that the correlations between variables are sufficient for factor analysis. The results also confirm that the correlation matrix is not an identity matrix, thereby validating the appropriateness of the dataset for factor extraction in this research.

Table 7.
Communalities.

	Initial	Extraction
I am satisfied with myself.	1.000	0.652
I often feel gratitude for the good in my life no matter how many times I encounter it.	1.000	0.545
I have unconditional acceptance for people and their unique quirks and desires.	1.000	0.510
I accept all of my quirks and desires without shame or apology.	1.000	0.766
I can maintain my dignity and integrity even in environments and situations that are undignified.	1.000	0.753
I am satisfied with myself.	1.000	0.660
Sometimes I think I'm not good at anything.	1.000	0.759
I feel that I have some qualities.	1.000	0.722
I can do things as well as most people.	1.000	0.385
I feel I am a person of value, at least as much as most people.	1.000	0.742
In this class, I have the freedom to learn in my own way.	1.000	0.652
I complete assignments in this class in the way I want to do them.	1.000	0.551
The way this class is structured allows me to learn in my own unique way.	1.000	0.303
I can accomplish the most difficult assignments are given in this class.	1.000	0.689
I share several common interests with my fellow classmates.	1.000	0.506

Items related to personal fulfilment and acceptance, self-worth and confidence have high communalities which confirms their significant relevance to the factor self-actualisation and self-esteem respectively. Furthermore, the table above also shows that statements about learning autonomy and social connection show a factor analysis of 0.652 which suggests that these aspects are well represented in the factor structure. Along with this, it is also evidently saying that factor 1 explains 45.75% of the variance, likely representative factors of self-actualisation and self-esteem. Furthermore, factors 2

and 3 contribute to an additional 8.34% and 7.56% of variance respectively and likely account for factors of psychological needs and self-expression in learning environments. Certain items in the above table show low communalities. For instance, "the way this class is structured allows me to learn in my own unique way" has a low communality of .303. This suggests that they may not have a strong alignment with the extracted factors of the data set.

Table 14.
Total Variance Explained.

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of Variance**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	6.780	45.198	45.198	6.780	45.198	45.198
2	1.268	8.455	53.653	1.268	8.455	53.653
3	1.137	7.582	61.235	1.137	7.582	61.235
4	0.991	6.605	67.840			
5	0.806	5.372	73.212			
6	0.724	4.825	78.037			
7	0.668	4.453	82.490			
8	0.541	3.604	86.093			
9	0.444	2.958	89.051			
10	0.398	2.655	91.706			
11	0.381	2.541	94.247			
12	0.257	1.712	95.959			
13	0.220	1.469	97.428			
14	0.211	1.404	98.831			
15	0.175	1.169	100.000			

Furthermore, the extraction values as seen above range from 0.302-0.778 which suggests that some items have strong contributions towards extracted factors. The eigenvalue suggests that three-factor solutions for the first three components have eigenvalues more than 1.0. This explains 61.64% of the total variance.

3.2.3. Reliability Test

Cronbach's Alpha is calculated to perform the reliability test, which checks survey items internal consistency and calculates how the same construct is being measured. There are multiple steps including computing item correlations to check that all items participate in a reliable scale in order to conduct. Reliability is considered acceptable if the value that is above 0.7. The Cronbach's Alpha for the construct is 0.821 which indicates good reliability as the five items used to measure this are consistent. Similarly, there is acceptable reliability as measured by the Cronbach's Alpha of Self-Actualization of 0.795. Both values are more than 0.7 which is the normally accepted limit, thus the questionnaire items used for these construct indicators are reliable and can be used for further analysis.

Table 15.
Reliability test.

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
Student achievement	0.821	0.821	5
Self-actualisation	0.795	0.797	5
Self-Esteem	0.783	0.786	5
Psychological Needs	0.729	0.731	5

For the third variable component of the study, which was self-esteem, the cronbach alpha value as calculated for the reliability analysis above is 0.783. This value is within the desired range and hence shows a high reliability. For the variable psychological needs too, the calculated Cronbach Alpha value is 0.729 which is within the desired range. This indicates the research methods used for measuring these two constructs of the study are highly reliable. This further explains that the same research methods can be used in the future similar studies to measure similar items as well for yielding similar results.

3.3. Hypothesis testing

3.3.1. Multiple regression

Multiple regression analysis is employed to examine the relationships among the variables selected for the study. This technique helps assess both the strength and direction of the linear associations. The R-squared value derived from the analysis indicates the extent to which the independent variables account for the variation observed in the dependent variable within the proposed research framework.

Table 8.
Multiple Regression Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.886[a]	0.786	0.784	0.36820

Note: a. Predictors: (Constant), Psychological needs, Self-esteem, Self-actualisation.

It can be identified from the abovementioned table that the correlation coefficient achieved in this study is valued at .886 which highlights the presence of a strong and significant relationship between the variables. In addition to this, the R square value is identified to be .786 which represents that the predictors Psychological needs, Self-esteem, Self-actualisation imparts a significant impact on student achievement. Furthermore, the adjusted R square value is identified to be .784 which represents a meaningful contribution to the outcome of student achievement. The relative smaller margin between the R square and the adjusted R square value helps in comprehending that the three predictors are well-capacitated and contribute accordingly to the dependent variable. The standar error achieved here is observed to be .36820 which highlights that the outcomes are credible and is lden with a lesser degree of error as the value is relatively small.

Table 9.
Multiple Regression Anova.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	196.933	3	65.644	484.216	0.000[b]
	Residual	53.685	396	.136		
	Total	250.618	399			

Note: a. Dependent Variable: Student Achievement
b. Predictors: (Constant), Psychological needs, Self-esteem, Self-actualisation

Regression ANOVA is used to evaluate the extent of variability within a regression model, which serves as the foundation for the assessment of the significance. From the abovementioned table it can be identified that mean square value achieved herein is 65.644 along with the value of F statistics at 484.216 which illustrates that the regression model is an excellent fit for the data. Furthermore, the sig value achieved here is .000 which further signifies that the observed relationship is highly statistically significant. Thus it can be comprehended that the three predictor variables Psychological needs, Self-esteem, and Self-actualisation cumulatively have a significant impact on Student Achievement.

3.3.2. Beta Coefficient

A standardised beta coefficient is calculated to assess the strength of each independent variable's impact on the dependent variable. The Table 19 highlights that the constant achieved for self-actualisation, self-esteem and psychological needs are .106, .427 and .471 respectively which highlights that psychological needs have the most significant impact on student achievement. Additionally, the standardised coefficient values are identified to be 0.107, 0.419, and 0.439 for Self-actualization, Self-esteem and Psychological needs respectively which further demonstrates that with the highest beta coefficient value, Psychological needs has the strongest positive effect on Student Achievement among the three predictors.

Table 19.
Beta Coefficient Results from Multi Linear Regression.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.010	0.080	/	0.131	0.896	-0.147	0.168
	Self-actualization	0.106	0.038	0.107	2.769	0.006	0.031	0.182
	Self-esteem	0.427	0.037	0.419	11.496	0.000	0.354	0.500
	Psychological needs	0.471	0.043	0.439	11.062	0.000	0.387	0.555

Furthermore, it can be identified from the abovementioned table that the sig value achieved herein varies across 0.006 for Self-actualization, 0.000 for Self-esteem and 0.000 for Psychological needs respectively. The sig values entail withing the required threshold of .05 wherein all three independent variables having p-values less than 0.01, indicates that the relationships are highly statistically significant. In addition to this, the standard error achieved in the ANOVA test exhibits a value of 0.038 for Self-actualization, 0.037 for Self-esteem and 0.043 for Psychological needs respectively. The relatively smaller values illustrates that the estimated regression coefficients are relatively precise and imparts a significant impact on student achievement. Furthermore, the confidence interval for B is identified to be 95% which also highlights that the regression coefficient for Self-actualization ranges between 0.031 and 0.182 along with that of Self-esteem between 0.354 and 0.500 and that of Psychological needs between 0.387 and 0.555 cumulatively highlighting a significant impact on the dependent variable. Hence, it can be concluded that the independent variables chosen in this research model has a significant impact on the dependent variable, Student Achievement.

3.3.3. Multicollinearity

A multicollinearity test in statistics is used for assessing whether independent variables in a regression model are highly correlated, which can potentially lead to unreliable coefficient estimates with the measurement of variance inflation factor (VIF) or tolerance.

Table 10.
Multicollinearity.

Model		Collinearity Statistics	
		Tolerance	VIF
1	Self-Actualisation	0.364	2.749
	Self-Esteem	0.407	2.458
	Psychological Needs	0.343	2.917

As can be seen in the above table, tolerance values range from 0.343 to 0.407 which shows being above the critical threshold of 0.1 and indicates that multicollinearity is not a severe issue. The VIF values in the above table also range from 2.458 to 2.917 which are below the common cutoff of 10. This indicates that multicollinearity is within an acceptable range. Furthermore, since VIF values are below 5, the predictors including self-actualisation, self-esteem and psychological needs do not exhibit any problems which means they provide unique contributions to the model. Along with this, even though there is some correlation between the predictors as shown by VIF values being above 2, it does not reach a value or level that can distort the regression results of the study.

The three independent variables of the study self-actualisation, self-esteem and psychological needs collectively have an impact on student achievement as shown by their inclusion in the model. Self-Actualisation has a moderate level of correlation with other predictors with the tolerance value of 0.364 and suggests it significantly contributes to the model while maintaining uniqueness. The tolerance level of self-esteem is 0.407 and the VIF calculated for the same variable as 2.458 which indicates that this variable is the least correlated with other predictors because of the highest tolerance value and lowest VIF. This further indicates that this variable has a relatively independent contribution to students' achievement. Lastly, for the independent factor psychological needs, it can be seen that the factor shows the highest correlation with other predictors but still within an acceptable range which suggests it is a crucial factor to influence student achievement.

4. Discussion

4.1 Discussion of Findings

4.1.1. Self-Actualisation Has a Significant Impact on Student Achievement of Urban and Rural Students in Sichuan, China

This hypothesis examines the impact of self-actualisation on students' academic performance in both urban and rural settings within Sichuan. The reliability test for the self-actualisation scale shows a satisfactory Cronbach's Alpha value, indicating consistent internal reliability. Results from the regression analysis highlight a positive correlation between self-actualisation and academic success.

These results are consistent with existing studies. Guo, et al. [20] note that self-actualisation—marked by traits such as creativity, curiosity, and personal growth—motivates students to strive toward realizing their full capabilities. Similarly, Liu and Cheng [21] contend that students with elevated self-actualisation levels tend to possess stronger intrinsic motivation, irrespective of their geographical context, which in turn enhances their academic performance.

However, it is important to acknowledge the contextual challenges faced by students in Sichuan, particularly in rural areas. Limited access to basic resources, educational facilities, and psychological support may hinder the fulfilment of foundational needs, making it more difficult for students to focus on higher-level aspirations like self-actualisation. Therefore, while self-actualisation plays a role in enhancing academic achievement, its effect may vary depending on the students' socio-economic conditions and support systems.

4.1.2. Self-Esteem Has a Significant Impact on Student Achievement of Urban and Rural Students in Sichuan, China

Numerous prior studies have demonstrated that a lack of confidence or low self-esteem can lead students to doubt their ability to succeed. This often discourages them from engaging in classroom activities or taking calculated risks necessary for academic growth [22, 23]. Students are more likely to participate actively in class, take initiative, and persevere through challenges when they have confidence in their abilities and self-worth.

The findings on self-esteem indicate that its reliability is satisfactory, as reflected by a Cronbach's Alpha value. Regression analysis further reveals that student achievement is positively influenced by self-esteem. On average, participants agreed that achieving goals—especially among young learners—cultivates a strong sense of self-worth, which in turn enhances their self-belief, resilience, and confidence.

4.1.3. Psychological Needs Has a Significant Impact on Student Achievement of Urban and Rural Students in Sichuan, China

The analysis of the final hypothesis indicates that psychological needs have a positive effect on student achievement. Several studies have shown that when urban students have sufficient access to online learning resources, they are more likely to seek additional academic support, which can boost their confidence [24]. In contrast, limited resources may lead to reduced expectations from instructors [25] causing students to feel undervalued and potentially lower their academic aspirations. Furthermore, financial instability can contribute to feelings of anxiety or disengagement from academics [26].

4.2. Limitations of the Research

Although this research offers meaningful insights into how psychological factors affect academic performance, it is important to recognize its limitations. Firstly, the study is confined to students within Sichuan Province, which may restrict the applicability of its conclusions to other parts of China or different cultural contexts. Secondly, the data collected is based on students' self-assessments, which may be influenced by personal bias, such as overstatement or understatement of their experiences. Moreover, despite attempts to represent both urban and rural demographics fairly, the sample size may not fully reflect the broader diversity among students. Finally, the research did not account for external variables such as family environment, teacher involvement, or the availability of school resources, all of which could significantly influence academic outcomes.

5. Conclusion

This study shows that university students' academic achievement in Sichuan is closely linked to three interrelated psychological resources: satisfaction of basic psychological needs, a secure sense of self-esteem, and a commitment to self-actualization. Among these, meeting basic needs for autonomy, competence, and relatedness emerged as the strongest unique contributor, suggesting that when students feel capable, connected, and genuinely volitional in their learning, performance follows. Self-esteem and growth-oriented aspirations add further, independent gains.

Limitations include the cross-sectional design, reliance on self-reports, and a single-province sample. Future research should employ longitudinal and experimental designs, test school-based interventions at scale, and examine contextual moderators such as institutional resources and family background. Overall, centering students' psychological needs while cultivating confidence and purpose offers a pragmatic, evidence-informed pathway to sustained academic gains.

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