Relationship between Academic Achievement, IQ Score and Period of Loneliness among Secondary School Students

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ABSTRACT

Loneliness is a common experience during adolescence. In this study researchers investigated the relationship between the amount of time children spend alone when their parents are absent and the impact of that time of loneliness on their academic performance. For the purpose, three strata each consisting of 60 children from various socioeconomic backgrounds on the basis of fee structure and annual school expenses are involved in the study. Thus the in total 180 students participated in the study. All the children/students are administered a standardised self-developed IQ test to categorise them in each stratum in three classes i.e. high, average and low on the basis of their IQ scores. In each stratum based on socioeconomic background all these students are further classified into three categorize based on the period of their loneliness along with three groups based on the IQ scores. Achievement scores of secondary school examination of students are used in the respective classes in each stratum for further statistical computations and inferences within the stratum and across the strata based on their IQ scores. To address the query that whether students' academic achievement and their period of loneliness are related, the mean and standard deviation of their accomplishment scores are calculated for secondary school students under consideration. To determine the significance of relationship between the three sets of IQ score classes, the ANOVA test was also used. The results indicate that there is a negative correlation between a period of loneliness and academic success, as opposed to IQ.

Keywords: Academic achievement, intelligence quotient (IQ), period of loneliness, socio-economic background

Introduction

For a child to attain his or her full genetic potential, parental time spent with the child and an ideal environment are necessary. Working parents have paucity of time to spend with their child. Because of job or other engagements, a deficiency in parental supervision when the child is regularly left alone at home for a longer time may affect academic performance of the child which is an area of further investigation. Child's loneliness (time spent apart from parents) may have a significant impact on a child's academic performance. This idea motivated the researchers to investigate the relationship between the amount of time children spend alone when their parents are absent and the impact of that time of loneliness on their academic performance.

Academic achievement is just one of the many areas in life where having high intellect might be advantageous, but it is not a guarantee. A multitude of factors, including persistence, inventiveness, and emotional intelligence, can impact success. Success can be measured in many different ways, not only in terms of professional accomplishments, and highly intelligent individuals may confront their own particular obstacles. Action, not potential, is what makes a successful outcome. Academic achievement is "the capacity to acquire new knowledge, retain it, reason logically, and apply it."

In their work, Favotto et al (2019) summarized loneliness as "the feeling that results from the absence of a social life that one desires, including a perceived discrepancy between the social contacts one has in relation to what they crave, an increase in their need for social connection that is not met, or a subjective feeling of isolation regardless of surrounding social opportunities"

The success of students with high IQ scores also cannot be guaranteed. However, a general perception is there that, high IQ students score high in exams. Therefore, it was pertinent to evaluate the association between three distinct groups of senior secondary school students' IQ scores, on accomplishment and loneliness period. Study widens the scope of visualisation as three different groups based on socioeconomic background are further classified in three categories on the basis of period of loneliness per day ranging from 0-3, 3-6 and 6-9 hours, in each socioeconomic group and in each period of loneliness students are further classified on the basis of high, average and low achievement levels in congruence with their IQ score obtained. The study highlights the outcome that how socioeconomic group and period of loneliness affects the achievement level for different IQ level classes within the stratum and for same IQ level across all the three strata based on period of loneliness. It is found that Achievement is affected adversely by the period of loneliness in contrast to IQ level.

Rationale of study

In the present era concept of united family is diluting and diminishing and there is a greater shift towards nuclear families. Also, now parents are very conscious about number of children they may care and want to have either one or two. Many parents believe that they may take care of only one child. Moreover, both parents are engaged either in job, in social work or one of the parents engaged at outstation while other in and around locality. Even in many other cases when there are siblings, others leave one sibling alone by going outstation or abroad for job or higher studies while their parents are engaged in their work and not be able to spend full time with their child when the child is at home. This situation gives scope to explore that how the period of loneliness affects the achievement/accomplishment level of the child while intelligent quotient varies.

Kurien (2022) found a positive linear relationship between intelligence and academic achievement. Cherry (2022) from the study on whether high IQ people are more successful found that success in the school or workplace is not always associated with high IQ level. Various other variables may influence life outcomes in addition to the possibility that those with high IQs may have an advantage in terms of achievement. However, the study does not undertake effect of the students' period of loneliness on their success or achievement. Terman and Oden (1959) started looking into the social and emotional growth of children with high IQs in the early 1920s. After tracking the kids, Terman discovered that the majority

of them were both physically and socially well-adjusted. In addition to excelling academically, they also tended to be taller, stronger, healthier, and less prone to accidents than a comparable group of kids with ordinary IQs. A study conducted in University of Washington by McElroy (2010) concluded that IQ scores and performance on reading, spelling, and math exams did not match in 90% of high-functioning children with autism spectrum disorders. Over the past few decades, the percentage of women in the work force has climbed significantly in many nations. Concerns regarding this trend's effects on children's welfare and long-term educational outcomes have sparked a heated discussion. Maternal and paternal employment may have a mixed influence on children's cognitive and educational success; while children may benefit from higher family income levels, parental employment limits the amount of time parents spend with their children (Schieldberg-Horisch, 2016).Pohkheryal and Pangtey (2023) from a study Relationship between Intelligence, Academic Motivation and Academic Achievement among Higher Secondary School Students revealed that higher the intelligence quotient, the higher the academic achievement of higher secondary school students.

Hafiz (2021) in a study on the effect of loneliness on academic participation and success among international university students reported that students who feel lonely and isolated tend to spend their time idly and therefore do not thrive in academic environments. Singh & Mahajan (2021) studied the impact of parental participation on senior secondary students' academic performance based on their gender and place of residence. From the study significant differences between male and female senior secondary students in both urban and rural areas with regard to their academic achievement and parental involvement was found. However, no such differences were observed between senior secondary students in urban and rural areas. Rosenstreich and Margalit (2015) found that loneliness was negatively correlated with recognition memory performance and with grades. On the other hand, Pervez (2018) reported that social isolation gives student time to self-study or solitary study that increases the academic performance or academic achievement.

All such studies undertook investigation of dependence of academic achievement on either IQ level or on parental employment or background. However, no studies are reported which takes both periods of loneliness and IQ levels together to see the dependence of academic achievement on them. Agarwal and Goswami (2020) investigated on how different periods of loneliness but same IQ level affects academic achievement. So contrary to this it also becomes interesting to investigate that how does academic achievement of students depend on different IQ levels but the same period of loneliness. The study was carried out with this intention and the findings are reported in this paper.

Objective

- To study the significant difference in academic achievement of secondary school students in relation to similar period of loneliness and IQ levels.

Hypothesis

- There is no significant difference in academic achievement of secondary school students with respect to their same period of loneliness and IQ levels

Methodology

Method: Causal comparative method was adopted in the study. The study included four different sorts of factors to determine the impact of a loneliness period on senior secondary school students on their academic achievement of secondary exam: i) family's socioeconomic status ii) student's intelligence score iii) period of time spent alone, and iv) student's academic performance. In this case, the fourth variable is dependent, and the first three are independent.

Population and Sample: The population of the study consisted of all the senior secondary students of Rajsthan.Three strata each consisting of sixty children from various socioeconomic backgrounds on the basis of fee structure and annual school expenses are involved in the study. The research was done on

three strata in a separate way to mute outside influences.There is no relationship among the three strata. Proportionate stratified random sampling is used in the present study. The population of each stratum is homogeneous (in terms of age group of students, educational environment, social, and economic aspects). There are 60 students in each stratum; based on the three phases of child's daily period of loneliness in hours (0–3, 3-6, and 6–9) each stratum is divided in three categories. In each category three groups based on IQ scores are formed.

IQ scores are used to categorise students in groups of high, average and low IQ groups only in each category of period of loneliness in each stratum. For further statistical analysis and interpretation secondary achievement scores of respective students are considered. The calculation of mean and standard deviation allows one to observe how the length of loneliness affects achievement scores even when IQ scores vary. The significance of mean difference of achievement scores of different IQ score groups is observed by employing ANOVA.

Tools: For the purpose, all the children/students are administered a standardised self-developed IQ test to classify them in three groups in each category of loneliness in each stratum i.e. high, average and low on the basis of their IQ scores

*Data collection and Analysis:*IQ scores are used to categorise students in groups of high, average and low IQ groups only in each category of period of loneliness in each stratum. For further statistical analysis and interpretation secondary achievement scores of respective students are considered. The calculation of mean and standard deviation allows one to observe how the length of loneliness affects achievement scores even when IQ scores vary. The significance of mean difference of achievement scores of different IQ score groups is observed by employing ANOVA.

Results

Three tables from the same stratum for different periods of loneliness are combined and maintained together for ease of use and comparison. The entire study is organized into homogeneous groups and layers to muffle outside influences. The categories, or strata, are built around the varying fee structures of various schools.

The mean and standard deviation (S.D.) of secondary board exam scores, or accomplishment levels, for students with varying IQs—high, average, and low—further classified based on the same time frame during which they experienced loneliness for (0–3), (3-6), and (6–9) hours.

Tables 1, 3 and 5 show mean and SD of achievement scores of students of high, medium and low socioeconomic backgrounds respectively. In each table three sub-tables are shown respectively for loneliness periods (0-3), (3-6) and (6-9) years indexed as A, B and C for ease of use and comparison.

Tables 2, 4 and 6 show ANOVA on scores of achievements of students of high, medium and low socioeconomic groups with different periods of loneliness and for different IQ classes within each period of loneliness.

Table 1: Mean and SD of achievement scores of students with different loneliness periods and different IQ levels within each loneliness period high socioeconomic background

IQ Score	Table 1A 0-3 Hours				Table 1B 3-6 Hours				Table 1C 6-9 Hours			
	High	Avg	Low	All	High	Avg	Low	All	High	Avg	Low	All
N	8	9	10	27	8	6	5	19	4	5	5	14
M	465.50	448.33	436.40	449	369.38	380.83	373	373.95	332.50	311	290	309.64
S.D.	17.952	28.614	28.574	27.682	46.093	13.571	32.711	33.771	34.034	44.777	23.452	36.923

Table: 2 ANOVA on scores of achievements of students with same loneliness period but different IQ levels of high socioeconomic background

Sources of Variance	Table 2A 0-3 Hours				Table 2B 3-6 Hours				Table 2C 6-9 Hours			
	SS	df	MS	F	SS	df	MS	F	SS	df	MS	F
Between Groups	3769.60	2	1884.80	2.80	456.239	2	228.12	.182	4028.214	2	2014.107	1.618
Within Groups	16154.40	24	673.10		20072.708	16	1254.544		13695.0	11	1245.0	

Table value 3.403 for df 2/24 at 0.95 level of significance. (MS: Mean Square, SS: Sum of Square)

The computed F value in each sub-table is less than table value of F at the 0.95 level of significance, Thus, there is no significant difference in mean scores of students in IQ levels in same period of loneliness. Moreover, it is true for all the three periods of loneliness for students of high socioeconomic background null hypothesis is not rejected.

Table 3: Mean and SD of achievement scores of students with different loneliness periods and different IQ levels within each loneliness period medium socioeconomic background

IQ Score	Table 3A 0-3 Hours				Table 3B 3-6 Hours				Table 3C 6-9 Hours			
	High	Avg	Low	All	High	Avg	Low	All	High	Avg	Low	All
N	7	11	8	26	6	4	6	16	7	5	6	18
M	447.14	432.09	428.75	435.12	385.0	416.25	404.17	400.0	321.43	317.0	294.17	311.11
S.D.	27.967	24.736	19.226	24.361	32.249	48.541	56.870	45.424	21.157	34.205	13.571	25.354

Table: 4 ANOVA on scores of achievements of students with same loneliness period but different IQ levels of medium socioeconomic background

Sources of Variance	Table 4A 0-3 Hours				Table 4B 3-6 Hours				Table 4C 6-9 Hours			
	SS	df	MS	F	SS	df	MS	F	SS	df	MS	F
Between Groups	1437.38	2	718.69	1.234	2510.41	2	1255.20	.574	2641.230	2	1320.61	2.391
Within Groups	13399.26	23	582.57		28439.58	13	2187.66		8286.548	15	552.43	

Table value 3.422 for d.f. 2/23 at 0.95 level of significance. (MS: Mean Square, SS: Sum of Square)

The computed F value in each sub-table is less than table value of F at the 0.95 level of significance, Thus, there is no significant difference in mean scores of students in IQ levels in same period of loneliness. Moreover, it is true for all the three periods of loneliness for students of medium socioeconomic background null hypothesis is not rejected.

Table 5: Mean and SD of achievement scores of students with different loneliness periods and different IQ levels within each loneliness period low socioeconomic background

IQ Score	Table 5A 0-3 Hours				Table 5B 3-6 Hours				Table 5C 6-9 Hours			
	High	Avg	Low	All	High	Avg	Low	All	High	Avg	Low	All
N	11	9	11	31	4	6	5	15	5	5	4	14
M	417.27	411.11	417.27	415.48	327.50	313.33	313.0	317.0	265.0	245.0	263.75	257.50
S.D.	19.022	32.286	32.044	27.366	35.940	20.656	10.368	22.424	33.541	37.081	38.379	34.683

Table: 6 ANOVA on scores of achievements of students with same loneliness period but different IQ levels of low socioeconomic background

Sources of Variance	Table 6A 0-3 Hours				Table 6B 3-6 Hours				Table 6C 6-9 Hours			
	SS	df	MS	F	SS	df	MS	F	SS	df	MS	F
Between Groups	242.48	2	121.245	.153	601.667	2	300.833	.561	1218.750	2	609.375	.465
Within Groups	22225.2	28	793.759		6438.333	12	536.528		14418.750	11	1310.795	

Table value 3.340 for d.f. 2/28 at 0.95 level of significance. (MS: Mean Square, SS: Sum of Square)

The computed F value in each sub-table is less than table value of F at the 0.95 level of significance, Thus, there is no significant difference in mean scores of students in IQ levels in same period of loneliness. Moreover, it is true for all the three periods of loneliness for students of low socioeconomic background null hypothesis is not rejected.

This analysis reveals that regardless of IQ class or level, the achievement level does not differ significantly within any period of loneliness. The achievement level in each category of loneliness is consistently similar within the level of significance for all the three classes of IQ. However, achievement is decreasing with increase in period of loneliness. Thus, achievement is affected adversely with the increase in period of loneliness while it is not affected significantly with variation in IQ within the same period of loneliness. Thus, Achievement is affected adversely by the period of loneliness in contrast to IQ level.

This pattern is independent of family background; i.e. same pattern is observed in all the three strata though the three strata are independent of each other.

Discussion

The present study observed a negative correlation between loneliness and achievement of secondary school students. The finding aligns with the past researches. Result of regression analysis indicated academic grades of students who did not practise mindfulness were negatively correlated with loneliness. The findings suggested that practicing mindfulness can reduce the effects of loneliness on academic performance (Rosenstreich & Margalit, 2015). However, study conducted on undergraduate students reported a low and positive correlation between loneliness and achievement score (Pervez, 2018). While assessing the causal relationship between IQ and achievement of secondary school students, the study found that achievement is affected adversely with the increase in period of loneliness while it is not affected significantly with variation in IQ within the same period of loneliness. In literature, it is underlined that the correlation between academic achievement and intelligence is positive and linear (Kurian, 2022). Hence, it is concluded that higher IQ levels are associated with higher academic achievement in students.

Conclusion and Implications

Academic performance or success is not entirely determined by level of intelligence. It has been repeatedly revealed that having high IQ does not ensure success in school achievement scores, rather a child needs the best possible care, supervision, parental involvement & guidance and spending good amount of time by parents with the child in order to nurture her potential optimally. Along with parental care and involvement other factors like a comprehensive syllabus that is completed on time and in the appropriate direction (with an eye toward the test), regularity in attending classes, attention, sharing of ideas and experiences, and physical and mental wellbeing may contribute significantly which were not in the scope of the present study.

References

Agarwal, I.B. & Goswami, A. (2020). A study of the level of academic achievement of students studying in higher secondary schools in relation to their level of intelligence and loneliness, Sodha Sanchar, 10(39), pp.7-11.

Cherry, K. (2022). Are High IQ People More Successful? A Modern Look at Terman's Study of the Gifted. Very well mind. Retrieved from https://www.verywellmind.com/are-people-with-high-iqs-more-successful-2795280

Favotto L, Michaelson V, Pickett W, Davison C. (2019). The role of family and computer-mediated communication in adolescent loneliness. *PLoS One, 14*(6): e0214617. https://doi.org/10.1371/ journal.pone.0214617.

Hafiz, B. (2017). Understanding the Effect of Loneliness on Academic Participation and Success among International University Students. *Journal of Education and Practice, 8*(14). https://files.eric.ed.gov/fulltext/EJ1143922.pdf

Kurian, A. (2022). Academic achievement and intelligence: investigation into gender and category differences. *Futuristic Trends in Social Sciences, IIP Proceedings*, 19-28.

McElroy, M. (2010). IQ scores fail to predict academic performance in children with autism.: University of Washington. Retrieved from https://www.washington.edu/news/2010/11/17/iq-scores-fail-to-predict-academic-performance-in-children-with-autism-.

Mizani, H., Cahyadi, A., Hendryadi, H., Salamah, S., &Retno Sari, S. (2022). Loneliness, student engagement, and academic achievement during emergency remote teaching during COVID-19: the role of the God locus of control. *Humanities & Social Sciences Communications, 9*(1), 305. https://doi.org/10.1057/s41599-022-01328-9

Pervez, S.I. (2018). The relationship between loneliness and academic achievement: a study on under graduate level students. *International Journal of Creative Research Thoughts, 6*(1). 1302-1305.

Rosenstreich, E. & Margalit, M. (2015). Loneliness, mindfulness, and academic achievements: a moderation effect among first-year college students. The Open Psychology Journal, 8. 138-145.

Schildberg-Hörisch, H. (2016). Parental employment and children's academic achievement. *IZA World of Labor*: 231 doi: 10.15185/izawol.231

Singh, M & Mahajan, P. (2021). Parental involvement and academic achievement: a study on senior secondary students. *Sodha Sarita* (29). 122-129.

Terman L. M., Oden M. H. (1959). *Genetic studies of genius: The gifted group at mid-life: Thirty-five years' follow-up of the superior child* (Vol. 5). Stanford, CA: Stanford University Press.

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