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Parent Child Relationship and Demographic Predictors of Intelligence of School Going Students

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The present study aims to find out the predictors of intelligence ('G' factor) of school going children from age group of 8 to 14 years (Class 5, 6, 7, 8th students). A total number of 1319 of students (male=670 and females=649) comprised as the sample for study. Stratified random sampling technique was used to select the sample. Mohsin's inventory and fair intelligence test was used to assess aspects like intelligence, parent child relation (P.C.R.), etc. Data was analyzed using hierarchical regression analysis. The results revealed that parent child relation and the age of students, education, and birth order predicted significant change in criterion variable, intelligence, (G factor);it shows there is positive relationship between P.C.R. and intelligence. The age and birth order were negatively related with intelligence measure (G' factor) in 8-14 year age group of students. For the reason it can be discussed in the light of increasing complexity of behaviour with age (8-14), and neglected child may also be restricted in 'G' factor of intelligence.The parent child relationship is positively related with 'G' factor of intelligence. Better the parent child relation so is 'G' factor of intelligence of the students.

Keywords: Parent child relation; Intelligence; Amos; hierarchical regression; demography

Home and outside environmental factor for the development of personality is highly significant as much as parent child relationship, type of family (Kumar & Shrivastava, 2016; 2017). Hurlock, 1998; Wolman, 2000, said that for a child parents and other family members are more important because family provides physical safety, economic support, social and emotional security (Jersild, 1987).

Intelligence is the major component for a healthy personality development. It depends upon several environmental and biological factors (Bouchard, 2009; Flynn, 2007).Intelligence Quotient is scientifically accepted. It is influenced by numerous types of biological factors. Many studies on twins reported that between 40 and 80 percent of variance in IQ is related to genetics, which may play a larger role than environmental factors in determining individual's IQ. Kovas, et al (2007) noted that the identical twins are more likely to have the same IQ scores than fraternal twins. Haworth et al. (2009) studied 11,000 twin pairs from four countries. The results revealed that genetic effect on general cognitive ability increase linearly from childhood period to adolescence stage to young adulthood stage (.41, .55, and .66, respectively).MRI analysis shows that women have more white matter and few gray matter areas related to IQ, and the strongest IQ gray matter correlations are in the female frontal and male frontal and parietal lobes (Haier, Jung, Yeo, Head, &Alkire, in press).Various types of studies reported that the low intelligence has been associated with crime, smoking, drug abuse, homelessness, alcohol abuse, unemployment, poor parenting readiness, bullying, fighting, school dropout, school failure and poor health care (Shaw (2008).The outcomes of various studies reveal that IQ is influenced mostly by genetic factors but the environmental factors also play a significant role. (Kumar et al. 2017; Kumar & Shrivatava, 2018).

The school students especially in Chhattisgarh, India are reported to be less active and attentive in school performance. It was necessary to determine the G factor of intelligence of the students and find out the predicting factors of intelligence.

Method

Participants:

Four independent samples of students from 5th, 6th, 7th, and 8th classes were analyzed. Total 670 (50.8%) boys and 649 (49.2%) girls were selected in the study.The sample comprised of 282 (21.4%) 5th class students (mean age = 10.39SD = .87, range from 8 to 14 years),and 376 (28.5%) 6th class students(mean age = 11.24, SD = .78, range from 10 to 14 years,). The third sample included 358 (27.1%) 7th class students (mean age = 12.17, SD = .84, range from 10 to 16 years and the fourth sample included 303 (23 %) 8th class students (mean age = 13.5, SD = .79, range from 10 to 14 years).

(The age range differences were observed in 7-8 class students, 8th class students age range is 10-14 years and 7th class students age range is 10 to 16 years. Because the some students not join school with the proper time and some of the student fail in the classes.)

In this study stratified random sampling technique was used; state schools were selected based on the principle of randomness, considering previous stratification by regions in the country, school grade and gender within the class group at the school level.

The school system in India considers four cycles in 1thto 12th class in primary, middle, high and higher secondary school. This study takes students from the 1st cycle and 2nd cycle of primary and middle school, equal to junior high school in other countries (5th – 8th grades), and middle school (6th – 8th grades), when students choose from among several curricular options in order to follow different graduation areas in higher education or professional specialization. The first school level corresponds to the first sample mentioned above, whereas the second level matches the second sample.

Design:

In the present piece of research, correlational research design was employed. Here, the criterion variable is intelligence; parent child relation, age, birth order, gender, and education acted as predictive variables in this study. Following random sampling 1319 school students were drawn from different government and private schools of the state of Chhattisgarh to serve as participants in the present research work.

Tools:1. Intelligence('G'factor) was measured by the culture fair intelligence scale 2(CFIT)Form A. This is designed for 8 to 14 years of children. The test is comprised of five reasoning subtests: test 1. Series(12 figural progressive and 3 min of administration time), test 2. Classification (14 classification subtest and 4 min of administration time), matrices (12 items and 3 min of administration time), condition (or topology 8 items and 2 1/2 min of administration time). Cattell A.K.S. Cattell (1992) reported internal consistency reliability α= 0.76 test-retest correlation α= 0.73 and criterion validity coefficient =.70.

Parents' child relationship was measured on Mohsin parent-child inventory (MPCI). Its indirect measure of the respondents' attitude towards his/her parents. The MPCI consists of 50 statements, usually comprising the so called parental attitude inventory, 25 statements conveying permissive and 25 restrictive disciplinary practices. The items of the MPCI are to be checked on a 4-point scale: The split half reliability of the MPCI using the S-B formula is .759. Its test-retest reliability is .703and construct validity is .396.

Students filled out a demographic information sheet, which included the information of the school, class, age, birth order and gender completed by the students.

Procedure:

A team of psychologists was specifically trained for the administration of the culture fair intelligence tests by means of a training course lasting eight hours. All participants were administered the culture fair intelligence scale 2, Form A (R.B. Cattell and A.K.S. Cattell 1992). The CFIT was administered in small groups of number and strictly adhered to conditions specified in the test's manual.

Statistical Analysis:

All 1319 cases were included for data calculation. Variance inflation factors (VIFs) were examined to detect multicollinearity. A hierarchical multiple regression models were

used to examine the effect of parent child relationship on intelligence. SPSS version 16.0 and AMOS 25 version was used for data calculation.

Results

First, a measurement model was tested for all samples using confirmatory factor analysis. In this model, a general intelligence (G) predicts the four measures comprised in the Subtest: series, classification, matrices and condition or topology. Several types of research have suggested that all the indexes are supposed to be above 0.90 to be a good fit (Tanaka & Huba, 1985; Bentler, 1990; Bentler & Bonnet, 1980; Bollen, 1989 as cited in Pandey & Shrivastava 2016).

The inconsistency in chi-square is the level of acceptance once > 0.05 (Wheaton et al., 1977). RMSEA should be accepted in the range of 0.05 to 1.00 the lower value is said to be a good level (Browne & Cudeck, 1993). Model fit was excellent in the samples [= 15.7, CMIN/DF = .684, RMSEA = .036, RMR=.028, GFI=.99, NFI=.99 and CFI = 1.000] (Figure 2) shows the regression weights. All values depicted in Fig.1 for the all school going students - series, classification and matrices show the largest values (>.64). Condition or topology shows the lowest weight for the sample (.30).(CFS1=Series, CFS2= Classification, CFS3= Matrices, CFS4=Condition or topology, F1=general intelligence).

Secondly, IQ for school going students was computed with respect to gender, birth order and education level. Figure 2, 3, and 4 shows the results: third birth order student show smaller IQ (75.76) than first birth order, boys students show smaller IQ (75.76) than girls students.

Fig. 1. Measurement model (Confirmatory factor analysis) for the all samples.

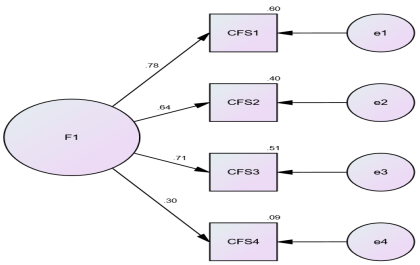


Fig.3. IQ scores for First birth order, Second birth order and Third to above birth order of school going students.

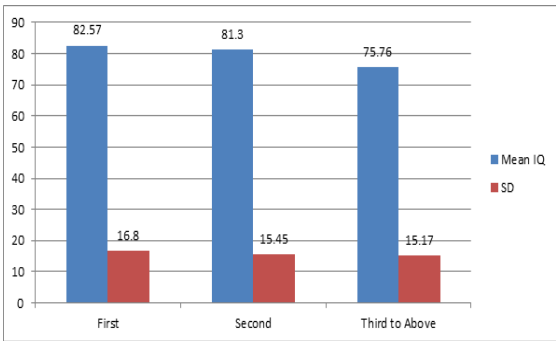
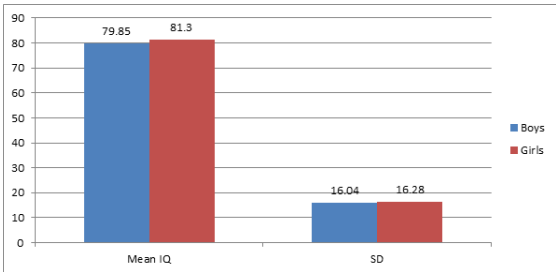


Fig.4. IQ scores for Boys and Girls of school going students.



Dependent Variable: IQvalue

Notes:- Model-(1-5)

Predictors: (Constant), Class, Birth Order, Gender, Age

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income

Predictors: (Constant), Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income, PCR total

Table no.1 indicates it clearly that VIF (Variance Inflation Factor) values ranged from 1.003 to 2.378, which were distant from the

Table- 1. Modal Summary of Hierarchical Multiple regression analysis.

Model	R	R^2	Adjusted R^2	DR^2	ΔF	df1	df2	Sig. F Change	Durbin-Watson
1	.230	.053	.050	.053	18.357	4	1314	.000	
2	.231	.053	.049	.000	.335	2	1312	.715	
3	.240	.058	.052	.004	2.989	2	1310	.050	.490
4	.434	.189	.182	.131	105.559	2	1308	.000	
5	.523	.274	.268	.085	153.280	1	1307	.000	

Table 2. ANOVA Results of the Five - Model- Hierarchical Regression Analysis

Sl. No.	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18246.743	4	4561.686	18.357	.000
	Residual	326520.408	1314	248.493		
	Total	344767.151	1318			
2	Regression	18413.532	6	3068.922	12.338	.000
	Residual	326353.619	1312	248.745		
	Total	344767.151	1318			
3	Regression	19896.092	8	2487.011	10.029	.000
	Residual	324871.059	1310	247.993		
	Total	344767.151	1318			
4	Regression	65044.578	10	6504.458	30.415	.000
	Residual	279722.573	1308	213.855		
	Total	344767.151	1318			
5	Regression	94405.989	11	8582.363	44.804	.000
	Residual	250361.161	1307	191.554		
	Total	344767.151	1318			

Table-3. Summary of hierarchical Regression analysis for variables predicting IQ

	Model	B	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	109.005		24.168	.000		
	Age	-3.345	-.260	-6.276	.000	.421	2.378
	Birth Order	-2.384	-.153	-5.703	.000	.997	1.003
	Gender	-1.857	-.057	-2.120	.034	.983	1.017
	Class	2.785	.184	4.441	.000	.421	2.373
2	(Constant)	108.557		23.616	.000		
	Age	-3.366	-.261	-6.295	.000	.418	2.390
	Birth Order	-2.404	-.155	-5.711	.000	.984	1.016
	Gender	-1.888	-.058	-2.152	.032	.980	1.020
	Class	2.760	.182	4.317	.000	.406	2.465
	Mother Age	.383	.017	.584	.559	.824	1.214
	Father Age	-.070	-.019	-.690	.490	.922	1.085

3	(Constant)	111.707		22.380	.000		
	Age	-3.397	-.264	-6.361	.000	.418	2.392
	Birth Order	-2.411	-.155	-5.728	.000	.981	1.019
	Gender	-1.854	-.057	-2.115	.035	.979	1.022
	Class	2.722	.180	4.261	.000	.405	2.467
	Mother Age	.346	.016	.527	.598	.822	1.217
	Father Age	-.074	-.020	-.729	.466	.921	1.085
	Mother Occupation	-1.163	-.065	-2.394	.017	.990	1.010
	Father Occupation	-.214	-.011	-.405	.685	.993	1.007
4	(Constant)	91.880		18.883	.000		
	Age	-3.183	-.247	-6.416	.000	.418	2.395
	Birth Order	-1.721	-.111	-4.364	.000	.964	1.037
	Gender	-1.018	-.031	-1.247	.213	.974	1.027
	Class	2.564	.169	4.320	.000	.405	2.469
	Mother Age	-.010	.000	-.017	.986	.820	1.220
	Father Age	-.088	-.024	-.932	.352	.921	1.086
	Mother Occupation	-.482	-.027	-.912	.362	.723	1.384
	Father Occupation	-.675	-.034	-1.375	.169	.988	1.012
	Mother Income	.403	.036	1.231	.219	.745	1.343
	Father Income	6.537	.365	14.140	.000	.932	1.073
5	(Constant)	78.829		16.686	.000		
	Age	-3.181	-.247	-6.774	.000	.418	2.395
	Birth Order	-1.321	-.085	-3.528	.000	.957	1.045
	Gender	-1.457	-.045	-1.884	.060	.971	1.029
	Class	1.981	.131	3.516	.000	.402	2.486
	Mother Age	-.609	-.027	-1.050	.294	.814	1.228
	Father Age	-.093	-.026	-1.040	.299	.921	1.086
	Mother Occupation	.224	.012	.444	.657	.714	1.402
	Father Occupation	-.865	-.044	-1.860	.063	.987	1.013
	Mother Income	.207	.018	.668	.504	.743	1.347
	Father Income	5.266	.294	11.717	.000	.883	1.132
	PCtotal	.163	.311	12.381	.000	.878	1.138

4.0 criteria that may indicate multicollinearity concern (Jang, Chiriboga, Kim, &Rhew, 2010). The first model explained 5.3% of total variance (R=.230, R2=.053; F (4, 1314) = 18.357; p<0.01). Model 2, with six predictor variables (Education, Birth Order, Gender, Age, Father Age, and Mother Age), was an improvement over the earlier model, with an R of 0.231 and an R2 of 0.053, thus 5.3% of the variance had been accounted for. The change in R2 was not significant F (2, 1312) =.335; p > 0.05; this shows that the second set of predictors (Father Age and Mother Age) could not predict IQ. Model 3, with eight predictor variables (Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation), gave a better value for R=0.240 and an R2 of 0.058, thus 5.8% of the variance had been accounted

for the change in R2 was significant F (2, 1310) = 2.989; p < 0.05; thus Father Occupation, Mother Occupation was a predictor of IQ. Model 4, with Ten predictor variables (Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income), was quite better, with an R of .434 and an R2 of .189 thus 18.9% of the variance had been accounted for, the change in R2 was highly significant F (2, 1308) = 105.559; p < 0.01; thus Father Income and Mother Income was a predictor of IQ. In model-5 and final model comprised of eleven predictor variables [Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income, PCR again gave a better value for R=0.523 and an R2 of 0.274 thus 27.4% of the variance had been accounted for the change in R2 was highly significant F (1, 1307) = 153.280; p < 0.01; So the parent child relation was a predictor of IQ.

Those participants who perceive higher level of parent child relation (.193, p<0.01) were more likely to have better intelligence.

Table 2 shows the ANOVA result of all the six models' value (four predictors, six predictors, eight predictors, ten predictors, eleven predictors, respectively), which were significant; (p < .01, p <.01, p <.01, p < .001 and p < .001 respectively). Regression weighs for Class, Birth Order, Gender, Age, Father Age, Mother Age, Father Occupation, Mother Occupation, Father Income, Mother Income and PCR of students obtained from the Hierarchal regression models depicted in Table-3. Age of the participants was negatively associated with intelligence (-.247, p<0.01); with increasing age participants reported low intelligence. Birth order of the participants was negatively associated with intelligence (-.085, p<0.01) that means first birth order students reported higher level of intelligence. For Class 5th, 6th, 7th, and 8th Father Income, Parent child relation of the students was positively related with intelligence (.131, p<0.01; .294, p<0.01;.311), with increasing education level, Father Income, good Parent child relation of the students reported higher level of intelligence. Those participants who perceive higher level of good parent child relation (.311, p<0.01) were more likely to have better intelligence.

Discussion

The main objective of the present study was to find out the predictors of Environmental factors for the development of Intelligence. Here, 1319 Indian school going students were considered from four independent and large representative samples of Chhattisgarh from Rural and Urban areas. Their IQ level was measured by the ('G' factor) culture fair intelligence scale 2. Education of the students were classified in India considered four cycles: primary, middle, high and higher secondary school. In model-1, education of the students was positively correlated to the intelligence scores (Table 1). Current findings are in full agreement with the earlier reports on IQ (Ceci, S. J., & Williams, W. M. 1997., Johnson, et. al., 2010., Neisser, U., Boodoo, G., Bouchard Jr, T.J., Boykin, A.W., Brody, N., Ceci, S.J., Halpern, D.F., Loehlin, J.C., Perloff, R., Sternberg, R.J., Others, 1998). Further, in model-1 Age of the participants, Birth order of the participants and Gender was negatively associated with intelligence. That means first birth order students reported higher level of intelligence than second, third, and fourth birth order, similar findings are reported by the Zanjonc & Markus, 1978, Zanjonc, 1986, 2001. The reason for such findings of the study could be that every child is born, he/she enters into a different family environment than the previous child. If there is second children enter in the family some environmental changes were observed with the lack of family attention, parents' time to share care, parental cooperation and conversation with their children. Drug addiction, and financial condition etc., of the family are important factors for 'G' factor of intelligence. A study conducted in Otago and Duke Universitie, which found that regular use of marijuana in teenage years, affects IQ in adulthood even when the user stops there is 8 point drop in IQ.

Conclusion

Family environment emerges as significant predictor for a better IQ. A good home environment, better parent child relationships, parents' higher levels of education and their wellbeing is important in enhancing the general intelligence of young students as there is a possibility in improving their G ability.

References

Bentler, P. M., & Bonnet, D. C. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin,88*(3), 588-606.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley.

Browne, M. W., & Cudeck, R., (1993). Alternative ways of assessing model fit. *Sage Focus Editions, 154*, 136- 136.

Blair C, Granger DA, Willoughby M, et al (2011). Salivary cortical mediates effects of poverty and parenting on executive functions in early childhood. *Child Development,82*(6):1970-8.

Ceci, S. J., and Williams, W. M. (1997).Schooling, Intelligence, and Income. *American Psychologist. 52*(10): 1051–1058. doi:10.1037/0003-066x.52.10.1051

D. Pandey, P. Shrivastava (2016). Psychometric Properties and Confirmatory Factor Analysis of the Social Support Scale. *International Journal of Indian Psychology*, Volume 3, Issue 4, No. 65, ISSN 2348-5396 (e), ISSN: 2349-3429 (p), DIP:18.01.152/20160304, ISBN: 978-1-365-34680-4

Haier, R. J., Jung, R. E., Yeo, R. A., Head, K., & Alkire, M. T. (in press). *The neuroanatomy of general intelligence: Sex matters.*

Hurlock E. B. (1988). *Personality Development*, New Delhi Tata McGraw Hill.

Haworth, C. M. A., Wright, M. J., Martin, N. W., Martin, N. G., Boomsma, D. I., Bartels, M., et al. (2009). A twin study of the genetics of high cognitive ability selectedfrom 11, 000 twin pairs in six studies from four countries. *Behavior Genetics,39*, 259–270.

Jersild T. (1987). *Child Psychology*, New Delhi : Prentice Hall of India

Johnson, W., Deary, I.J., Silventoinen, K., Tynelius, P., Rasmussen, F., (2010)."Family background buys an education in Minnesota but not in Sweden". *Perspectives on Psychological Science. 21*(9), 1266–1273.doi:10.1177/0956797610379233.

Wolman, B. B. (2000). *Hand book of Development Psychology*, New York, Plenum.

Kovas Y. et al.The genetic and environmental origins of learning abilities and disabilities in the early school. *Monogr Soc Res Child Dev, 2007, 72*(3): 1-144.

Kumar, M., Pandey, D., & Shrivastva, P. (2016). Effect of GSR Biofeedback Relaxation Training on Blood Glucose and Anxiety Level of Type 2 Diabetic Patients, *The International Journal of Indian Psychology 4*(1).

Kumar, M., & Shrivastava, P. (2017). A Study of Psychological factor discriminating diabetic and non-diabetic patients. *Indian journal of health and wellbeing 8*(8), 881-884.

Kumar, M. & Shrivastava, P., (2018). Effect of mobile phone use on stress parameters. *International journal of basic and applied research*. Volume 8 Number 6, ISSN 2249-3352 (P) 2278-0505 (E).

Neisser, U., Boodoo, G., Bouchard Jr, T.J., Boykin, A.W., Brody, N., Ceci, S.J., Halpern, D.F., Loehlin, J.C., Perloff, R., Sternberg, R.J., Others, (1998). Intelligence: Known's and Unknowns. *Annual Progress in Child Psychiatry and Child Development 1997*. Retrieved on 2008-03-18.

Bouchard, T. (2009). Genetic influence on human intelligence (Spearman's g): How much? *Annals of Human Biology, 36*, 527–544.

Flynn, J. R. (2007). *What is intelligence. Beyond the Flynn effect.* Cambridge: Cambridge University Press.

Tanaka, J.S., & Huba, G. J. (1985). A fit index for covariance structure models under arbitrary GLS estimation. *British Journal of Mathematical and Statistical Psychology, 38* (2), 197-201.

Wheaton, B., Muthen, B., Alwin, D. F., & Summers, G. (1977). Assessing reliability and stability in panel models. *Sociological Methodology,8*(1), 84-136.

Kumar, M., Pandey, D., & Shrivastva, P. (2016). Effect of GSR Biofeedback Relaxation Training on Blood Glucose and Anxiety Level of Type 2 Diabetic Patients,*The International Journal of Indian Psychology,4*(1).

Neisser. U., Intelligence: Knows and Unknows.

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