

**EFFECT OF SCHOOL POLICIES AND PRACTICES ON  
SCHOOL ACHIEVEMENT IN KARNATAKA**

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chapter headings  
and sub-sections may  
be properly given

## PREFACE

In the context of the current national priority on Universalisation of Elementary Education, improvement in academic standards is emerging as a major concern. National efforts to implement reforms aimed at improving quality and efficiency of schooling. In this context, Baseline Assessment Studies (BAS) have been started under the DPEP.

Here an attempt has been made to examine the effect of school policies and practices and State interventions on students' achievement, using BAS data of Karnataka, collected during the second phase of DPEP. The Hierarchical Linear Model (HLM) analysis has been used in this study.

I am thankful to Prof R R Saxena, Head, DES&DP, NCERT and his colleague Mr O P Arora for constant guidance and extraordinary help at various stages of this study.

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**D Basavayya**

## EFFECT OF SCHOOL POLICIES AND PRACTICES ON SCHOOL ACHIEVEMENT IN KARNATAKA

This may  
be the title  
of the report

learner & Primary level

### Need of the Study :

At the time of independence in 1947, India inherited an educational system which was not only quantitatively small, but was also, characterized by acute gender and regional disparities along with structural imbalances. Only 14 percent of the population was literate and only one child out of three had been enrolled in primary school. Recognising that education is vitally linked with the totality of the development process, the reform and restructuring of the education system was accepted as an important area of state intervention.

could  
be dropped

The National Policy of Education (NPE, 1986) have given the priority for universalisation of elementary education by focusing on three aspects viz.

- i. universal access and enrollment
- ii. universal retention of children upto 14 years of age
- iii. improvement in the quality of education to enable all children to attain essential levels of learning.

To achieve these, a number of strategies are being formulated for application at the grassroot level. One of them is the district specific planning to develop the educationally backward districts as envisaged in the Programme of Action (POA, 1992). In this direction, in 1993 a new initiative the District Primary Education Programme (DPEP) has been launched with the following objectives.

To develop and implement in the selected districts, a replicable, sustainable and cost-effective programmes so as to

- i. provide all children access to primary education through formal primary schools or its equivalent alternatives.
- ii. reduce overall dropouts at the primary level to less than 10 percent,
- iii. increase achievement level by 25 percent over the measured baseline levels and
- iv. reduce disparities of all types (gender, SC/ST, rural/urban, etc) to less than 5 percent.

In order to project a true picture of the primary schools for planning interventions, we need to know the baseline. From this take-off point an exercise for systematic planning of interventions can be undertaken. In this process the integrity of the data is of vital importance. There is an emphatic need to identify the factors which make schools effective. In this context achievements - surveys are significant.

Like any project DPEP requires rational investment decisions, research based interventions. To fulfill this requirement Baseline Assessment Studies (BAS) were conducted in 1994 as a part of the DPEP in 46 districts in the states of Assam, Haryana, Karnataka, Kerala, Madhya Pradesh, Orissa and Tamil Nadu to provide research-based support to the district plans. In the second phase, the DPEP project is being extended to some other states, Karnataka which is one of these states and five districts viz. Bangalore Rural, Bellary, Bidar, Gulbarga and Mysore were selected in this state.

The objective of Baseline Studies were to

- i. assess the achievement level of students who were nearing the end of the primary cycle in the districts under the DPEP programme and to investigate differences in achievements of the different groups of students (boys/girls, SC/ST students and rural and urban students).
- ii. estimate the level of learning of simple skills of literacy and numeracy achieved at the end of class I and of students who had dropped out after 3 or 4 years of schooling, and
- iii. collect data on relevant pupil background and school factors that explain differences in the learning achievement of pupils at the end of the primary stage.

*The BAS was undertaken - - - - - and project report is available. However - the results have only given ground data without giving clear cut direction for planning.*

The present study attempts to examine the effect of school policies and practices and state interventions on students' achievement using BAS data of Karnataka, collected during the second phase of the DPEP from the districts - Bangalore Rural, Bellary, Bidar, Gulbarga and Mysore.

*could be dropped - repetition*

### Objectives of the Study :

The main objectives of the present study are to examine

- i. the effects of school policies and practices on learners' achievement *level factors*
- ii. the achievement differences between boys and girls in relation to school level variables *factors*
- iii. the effects of school policies and practices on achievement gap between SC/ST and non-SC/ST and
- iv. the impact of state interventions on learner's performance.

## Methodology

### Sample Design

This study is based on sample survey conducted in the context of DPEP during the second phase in Karnataka. Five districts viz. Bangalore Rural, Bellary, Bidar, Gulbarga and Mysore were selected for the study based on the low female literacy rate. About 20 per cent of rural blocks and urban areas were randomly selected from the districts with a view to cover atleast one tribal block. From these selected blocks and urban areas, 35-45 primary schools were randomly selected for each district. The representation of rural and urban areas was made on the basis of proportionate allocation considering the rural and urban population.

Further, the students of class IV were selected. When the number of students in a school was less than or equal to 30, all students were selected. Otherwise, only 30 students were randomly selected. While selecting the teachers, the procedure followed was to include all the teachers in the selected schools if the number of teachers (including head teacher) was less than or equal to five and if more than five, only five teachers were selected randomly. Following this procedure 382 teachers were finally included in the present study.

*It is better to present district-wise and category-wise (schools, teachers, pupils etc) data of the selected sample in a table.*

While selecting rural/urban blocks, schools and students, multistage random sampling procedure had been used. In all 2709 students from 211 schools were covered in this study.

## Tools

The instruments used to collect data were

- i. a standardized achievement test in reading comprehension for grade 4
- ii. a standardized achievement test in Mathematics for grade 4
- iii. an interview schedule for teachers and
- iv. a schedule for recording data from school records.

*pl give the  
titles of tools,  
test length etc*

## Data Collection

All the instruments were administered by interviewers trained in the classroom (off the field) and on the fields. The collected data were processed by using computers for further analysis.

## Indicators

*2 why difference in factors and indicators*

Educators have become increasingly convinced that the characteristics of schools are important determinants of academic achievement along with the pupil background. The important pupil's background factors are parents' education and their occupation, social background, prior learning achievement, home environment, family size, etc. there are some external factors like health of the pupil, economic development of the locality, means of communication, etc. The important school factors are infrastructural facilities, curricular content, quality of instructional material, teachers' competence, classroom teaching and learning activities, evaluation and feedback, teachers' attitude, supervision and monitoring, parents involvement, special interventions like Operation Blackboard and incentive schemes (like Mid-day meal, scholarships, free textbooks, uniform, etc).

As we see, the above factors are not only very large in number but also very difficult to identify and measure in a comprehensive manner because they are governed by several constraints. The school factors are clubbed into four divisions viz. Teacher quality, school resources, school academic climate and the state interventions as shown in the following three phases (Input-processing-Output) of the primary education system.

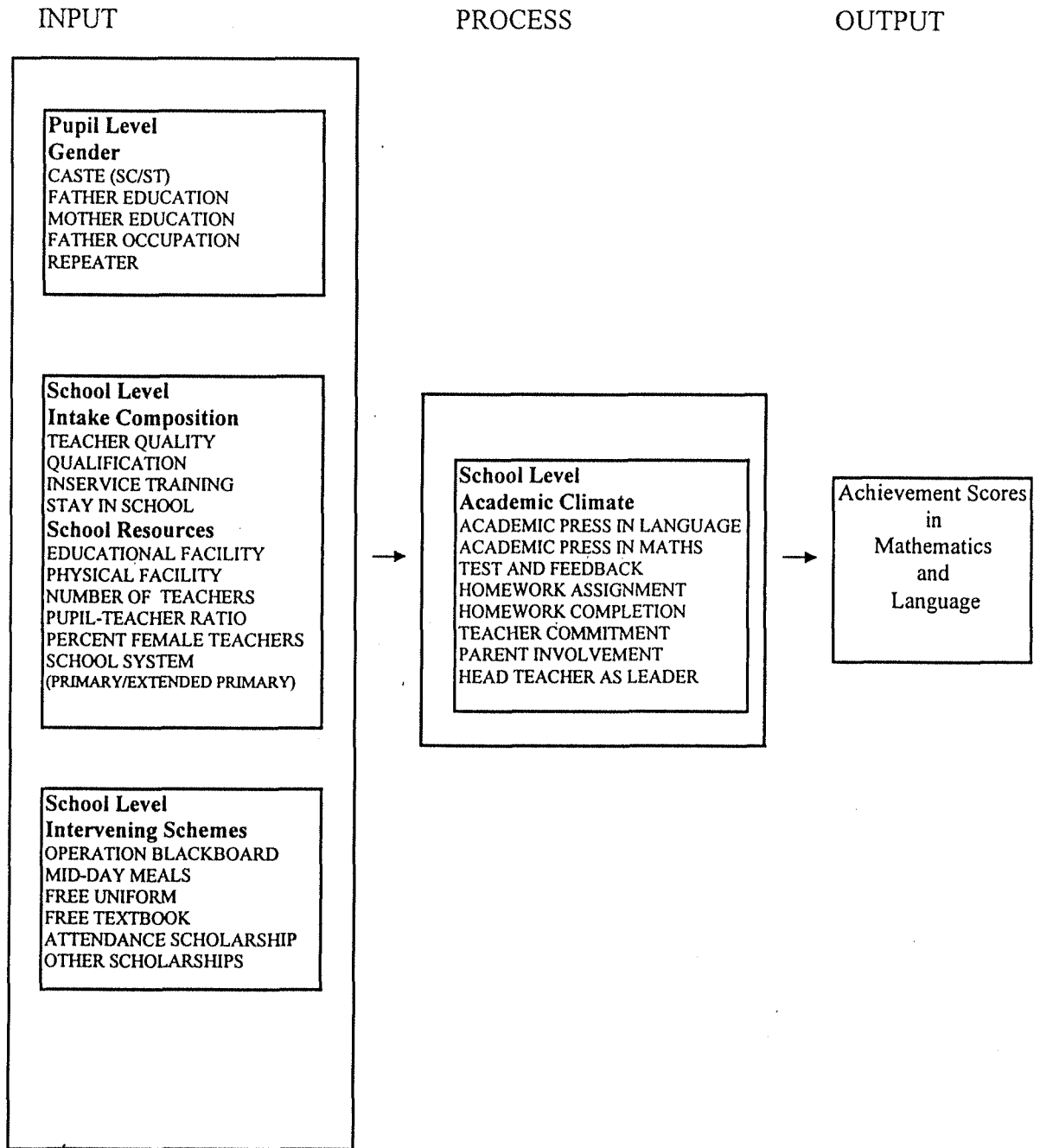
what about  
pupil's variables  
? all mentioned  
above

The achievement depends not only on the policies and practices of school, but also on the background characteristics of pupils entering the school, and on wider social and economic factors that lie outside the control of teachers or administrators. The overall ability and SES (Socio-Economic Status) composition of a school also affect environment. School with high social-class or high ability intakes have some advantages - fewer disciplinary problems and an atmosphere conducive to learning. They are more likely to attract and retain talented and motivated teachers. Also there are peer effects that occur when bright and motivated pupils work together (Heath, 1984). Contextual effects can occur also at a classroom level when schools allocate pupils into different classes on the basis of their ability (Willms and Chen, 1989).



Fig. 1.1

INPUT-PROCESS-OUTPUT MODEL



Reproduced from the book entitled 'School Effectiveness and Learner's Achievement at Primary Stage' and edited by RR Saxena, Satvir Singh and J K Gupta.

Based on the conceptual frame-work indicated by Willms (1992), all the items of information given in students' schedule, school record schedule and teacher schedule were thoroughly examined in respect of their relevance and decided to consider the following indicators pertaining to students, teachers, schools, etc. to study their impact on students' achievement in Mathematics and Language.

### Indicators at Pupil and School Levels

Sl No	Indicator Description	Variable Label	Procedure adopted in construction of Indicators
	<b>Pupil's Level</b>		
1.	Gender	Girl	Girl = 1, Boy = 0 Centred at Pupil level
2.	Caste	SC/ST	SC or ST = 1, Non SC/ST = 0 Centred at pupil level
3.	Father's Education	DADED	Illiterate = 1, Literate = 2, Primary = 3, Secondary = 4, Hr Sec/Sr.Sec = 5, College = 6. Transformation and standardized.
4.	Mother's Education	MUMED	As above
5.	Father's occupation	DADOCC	Unskilled worker = 1, Poultry farming = 2, Picking Forest product = 3, Agri. Labour = 4, Farmer = 5, Skilled worker = 6, Street vendor = 7, Other = 8, Self employed = 9, Domestic servant = 10, Household = 11, Clerk = 12, Employer = 13, Senior Officer = 14. Transformation and standardized.
6.	Repetition in a class	REPEAT	REPEAT = 1 if yes in any class, ELSE = 0. Centred at pupil level.
7.	Socio-economic status	SES	SES = (DADED + MUMED + DADOCC) / Valid response. Composite and standardized.

Sl No	Indicator Description	Variable Label	Procedure adopted in construction of Indicators
	<b>School Level : Teachers' Variables</b>		
1.	Qualification	TCHQUA	Class VIII - 8, Class X = 10, Class XI/XII = 12, Graduate = 4, Postgraduate = 16, Aggregated and centered at school level.
2.	Experience	TCHEXP	1996 - year of first appointment Aggregated and Centred at school level
3.	Inservice	INSERVIC	INSERVIC = 1, if received during last 3 training years, Aggregated and Centred at school level.
4.	Period in present school	STABLE	Subtract year of appointment from 1996 Aggregated and Centered at school level.
	<b>b)Resource variables</b>		
1.	Access to Teaching Material	MATERIAL	Add all "yes = 1" against the items blackboard, teachers' guides, dictionary, books, maps, globe, chart, flash cards, science kit, math kit. Aggregated and centered at school level.
2.	Instructional Material available	FACILED	Add all "yes = 1" for items Maps, Globe, Games, Equipment, Science Kit, Mini Tool Kit, Mathematics Kit, Books for library - Reference, Dictionary Encyclopedia, Books for library - children's books, books for library - magazines, journals, newspapers, blackboard, pin-up board/notice board. Aggregated and centered at school level.
3.	Physical facilities	FACILPH	Add all "yes = 1" for school bell, maps and furniture for students , chairs for teachers, tables for teachers, water pitcher, glasses, dust-bins, safe drinking water and toilet facilities, Separate toilet for girls, electric connection, playground facilities, annual medical checkup for children, immunization facility, first aid kit, aggregated and centered at school level.
4.	Number of teachers	NUMTCH	Total of Male and female teachers for 95-96 Centred at school level.
5.	Pupil Teacher Ratio	PTRATIO	Total enrollment of classes I - IV / NUMTCH Centred at school level.
6.	Primary and Extended Primary	PRIMARY	PRIMARY = 1 for classes I - V, ELSE = 0 Centred at school level.
7.	Percent of Female Teachers	PCTFEMT	Female Teachers x 100 / NUMTCH Centred at school level.

Sl No	Indicator Description	Variable Label	Procedure adopted in construction of Indicators
	<b>c) School Climate Variables</b>		
1.	Academic Press in Language	PRESSLNG	Teachers ask to read and give dictation in class : Never = 0, Sometimes = 1, Everyday = 2 Average by valid responses, Aggregated and centred at school level.
2.	Academic Press in maths	PRESSMTH	Teachers give arithmetic problems to solve in class. Never = 0, Sometimes = 1, Everyday = 2. Aggregated and centred at school level.
3.	Academic Press: Test and Feedback	PRESSTST	Teachers give test and feedback to students. For test : never = 1, once a while = 2, once in a year = 3, once in a term = 4, once in a month = 5, once in a week = 6. For feedback not applicable = 1, never = 2, sometimes = 3, always = 4. Average by valid responses after using Logit. Aggregated and centred at school level.
4.	Academic Press: Teachers' give Homework	PRESSTHW	Teachers assign and correct homework : Never = 0, sometimes = 1, always/regularly = 2, average by valid responses. Aggregated and centred at school level.
5.	Academic Press: Pupil doing Homework	PRESSPHW	No and do not do homework = 0, less than 30 Mts = 1, 30-36 = 2, 61-120 mts = 3, over 120mts = 4. Aggregated and centred at school level.
6.	Teacher Commitment	COMMIT	Teacher comes to class: Rarely = 1, Sometimes = 2, Most of the days = 3, Everyday = 4, Teacher Provide Special help : Never = 1, Sometimes = 1, Always = 3, Average by valid responses after Logit. Aggregated and centered at school level.
7.	Parent Involvement	PRNTINV	Parent-teacher meetings : Never = 0, once in a year = 1, once in a term = 2, once in a month = 3, once in a week = 4, Average by valid responses, Aggregated and centered at school level.
8.	Head Teacher as leader	HMLEADER	Reviewing the Performance of his/her class and all classes : Never = 0, Once in year = 1, Once in a term = 2, Once in a month = 3, once in a week = 4. Average by valid responses, Aggregated and centered at school level.

Sl No	Indicator Description	Variable Label	Procedure adopted in construction of Indicators
	<b>d) Intervention Variables</b>		
1.	OB Scheme	OPBLACK	Recode OPBLACK = 1, Else = 0, Centered at school level.
2.	Material as per OB Scheme		Add all 'yes = 1' as in cases of material.
3.	Mid-day Meals	MDMEAL	Percentage of beneficiaries = ((Male + Female) / (enrollment in primary class)) x 100 Centered at school level.
4.	Free uniform	UNIFORM	Percentage of beneficiaries = ((Male + Female) / (Enrollment in primary class)) x 100. Centered at school level.
5.	Free Textbooks	TEXTBOOK	As in case of uniform.
6.	Scholarship for Regular Attendance	SRATTEND	As above
7.	Other scholarship	OSCHOLAR	As above
	<b>III. Contextual Variables</b>		
8.1	School Mean SES	MEANSES	Aggregated from pupil to school level. Centred at school level.
9.2	Percentage of SC/ST	PCTSCST	Percent of SC and ST in the school . Centered at school level.

### Analysis

A multilevel regression analysis based on the 2-level HLM given by Bryk and Raudenbush (1992) was used to analyse the data. The students are nested within schools. The HLM procedure helps to partition the variation in a variable into within and between schools, and to examine the relationships among variables both within and among schools.

The 'null model' as a first step of HLM analysis is used to identify the within and between school variances without considering any student background variables and their covariates. The dependent variables here are Mathematics scores and language scores in two separate regression equations. The standardized scores were

used for better comparison. In the next step, the pupils' background variables were included to explain the within as well as between school variation. The student background variables which did not indicate significant variation across schools have been constrained. The difference between within school variance before and after adjusting the pupils' background variables provided the variance explained by the pupils' background variables. This analysis also provided the adjusted school means.

The mean SES and per cent SC/ST of the school were considered important variables as the intake composition of a school, which can have a contextual effect on student achievement over and above the individual characteristics. These two variables have been indicated in the analysis for further adjustment of the school means.

The factors related to three different school level constructs, viz. Teacher quality, school resources and school academic climate were included end block in the HLM analysis independently after adjusting for the effects of pupils background and contextual variables.

In order to study the achievement gap between boys and girls, and between SC/ST and non-SC/ST students, these gaps were modeled by the factors of teacher quality, school resources and school climate.

The impact of state interventions viz. OB scheme and incentive schemes was analysed independently. The effect of OB scheme only and OB scheme along with OB material were obtained separately with the help of HLM. The intervention variables were also included in modeling the achievement gap in boys and girls. The

SC/ST gap is specifically modeled by the indicators of incentive schemes as these schemes were for the weaker sections of the society. Some of the important aspects were examined with the help of appropriate graphical plot.

**Effect of Students Background Variables :**

By fitting the null model

Level - 1 (Pupil)  $Y = B_0 + R$

Level - 2 (School)  $B_0 + G_0 + U_0$

the within and between school variance were obtained as in Table 1 separately for Mathematics scores and language scores. Later students' background variables like GIRL, SC/ST, DADED, MUMED, DADOCC, REPEAT and SES were introduced in Level - 1 model to obtain the adjusted variances.

*shift at the appropriate place - later*

**Table 1: Unadjusted and Adjusted (for students' Background Variables) Variances regarding within and between School Variances in Mathematics and Language.**

	Mathematics		Language	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Within	0.48291	0.42465	0.47697	0.44967
Between	0.54782	0.53209	0.49144	0.48046

*S = T*

*= 1*

Table 1 indicates that between school variances are statistically significant and greater than the within variances for both Mathematics and Language. The variances were more in Mathematics when compared to language. The variances adjusted for students' background were reduced but not substantially both in Mathematics and Language.

*at the end of his adjusting*

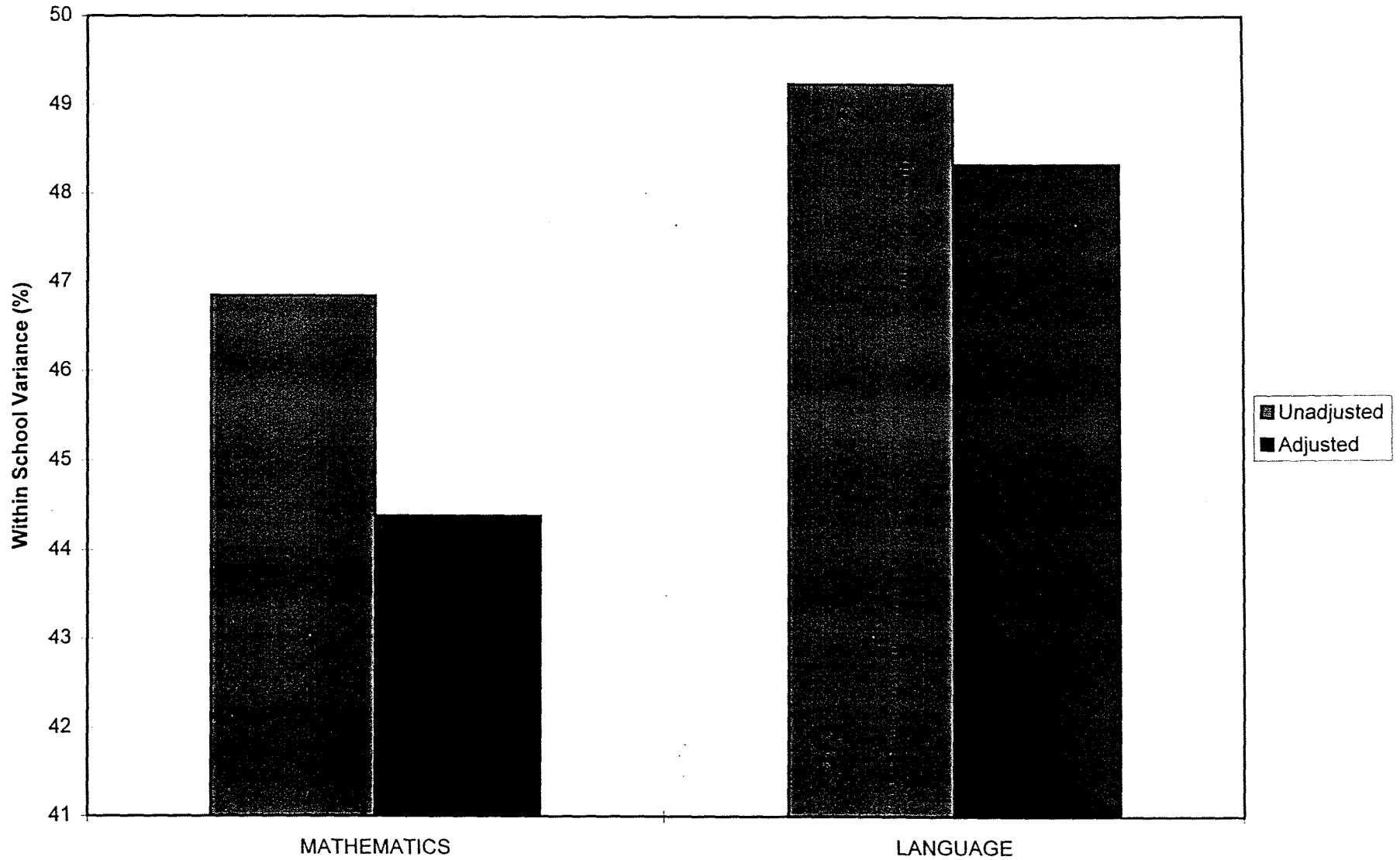
*shift*

*→ give interpretation*

3. Figure -

to be referred on the Test also

Within School Variance Before and After Adjusting for Pupil's Background





The effect of individual background variables in the reduction of within school variances were shown in Table 2.

**Table 2 : Percentage Reduction in Within Variance due to individual background variables**

Student Background Variable	Percentage of Reduction in Within Variance	
	Mathematics	Language
GIRL	8.99	3.62
SCST	1.93	1.70
DADED	1.35	0.69
MUMED	0.43	0.17
DADOCC	1.18	0.08
REPEAT	0.56	0.06
SES	0.77	0.33

*to be taken up later on after present. the types*

**Effect of Students' Background and School Context Variables**

The contribution of students' background and school context variables to Mathematics and language achievement was shown in Table 3 as below.

**Table 3 : Effects of Students' Background and School Context Variables on Achievement in Mathematics and Language**

Variable	Mathematics		Language	
	Coefficient	Standard Error	Coefficient	Standard Error
School Mean	0.0016	0.0527	-0.0315	0.0504
MEANSES	0.1077	0.1042	0.1031	0.1000
PCTSCST	-0.0021	0.0017	-0.0006	0.0017
GIRL	-0.0559**	0.0410	-0.0410**	0.0338
SCST	-0.0964*	0.0374	-0.0535**	0.0384
DADED	0.0385	0.0453	0.0298	0.0462
MUMED	0.0363	0.0459	0.0287	0.0468
DADOCC	0.0028	0.0474	0.0215	0.0484
REPEAT	0.0051	0.0379	-0.0329	0.0383

*This is Type E (Just Type A and then Type B both should have random effects) and id*

Variable	Mathematics		Language	
	Coefficient	Standard Error	Coefficient	Standard Error
SES	-0.0158	0.0938	-0.0223	0.0958
Residual Variances :		Mathematics	Language	
School Mean	0.5311**		0.4819*	
GIRL	0.1684*		0.064*	
SCST	0.0355*		0.0401**	
Pupil Score	0.4312*		0.4531	

\* Significant at 10% level

\*\* Significant at 20% level

Table 3 indicated that there were large and statistically significant differences between boys and girls within schools in their achievement in Mathematics and Language. Boys achievement was better (5.6 % higher in Maths and 4.1% in language) than girls. Similarly, there were large and statistically significant gaps in Mathematics and language achievement of SC/ST and non-SC/ST students. Non SC/ST students' achievement was better (9.6% in Maths and 5.3% in Language) than the SC/ST students. Except SES, GIRL and SCST, all other students' background variables have a positive association with Mathematics achievement. But in case of language achievement REPEAT was also having a negative association, though it was not significant. From this one may conclude that the students who were poor in language had to repeat the classes.

The MEANSES has positive association with both Mathematics and language achievement whereas the PCTSCST obviously has negative association. The MEANSES and PCTSCST have reduced the variance by 0.19% only. Even after adjusting for MEANSES and PCTSCST variables, still there were significant differences between the school means, the GIRLS' slopes and between SCST slopes. This means other school variables were to be investigated for these differences.

**Effect of School Level Variables on School Achievement :**

The variation between schools after adjusting for school variables were examined and reported in Table 4.

**Table 4 : Percentage Reduction in Between School Variance due to Individual School Variables**

School Variable	Percentage Reduction in Between Variance	
	Mathematics	Language
TCHQUA	2.04	-0.43
TCHEXP	-0.37	-0.53
STABLE	0.55	-0.51
INSERVICE	-0.31	-0.43
MEANSES	1.61	0.90
PCTSCST	2.10	0.18
PRNTINV	-0.13	0.53
HMLEADER	-0.49	0.02
PRESSLNG	1.99	8.53
PRESSMTH	5.04	8.26
PRESSTST	11.41	11.68
PRESSTHW	8.38	10.15
PRESSPHW	1.90	1.81
COMMIT	3.81	4.46
FACILED	0.78	-0.51
FACILPH	0.77	-0.53
NUMTCH	0.05	2.56
PTRATIO	6.81	2.83
PCTFEMT	2.76	1.18
MATERIAL	3.18	0.90
PRIMARY	-0.55	-0.33
FACILOP	1.99	-0.47
OSCHOLAR	-0.51	-0.47
SRATTEND	0.66	-0.16
TXTBOOK	-0.47	-0.16
UNIFORM	-0.11	-0.31
MDMEAL	-0.53	-0.49
OPBLACK	-0.33	0.43

*Full model  
not required  
- only meaningful models  
- contrast variables  
- some crucial ones to know*

The variation between schools after adjusting for students' background and contextual variables were examined below to find out the contribution of the school level factors relating to teacher quality, school resources and school academic climate.

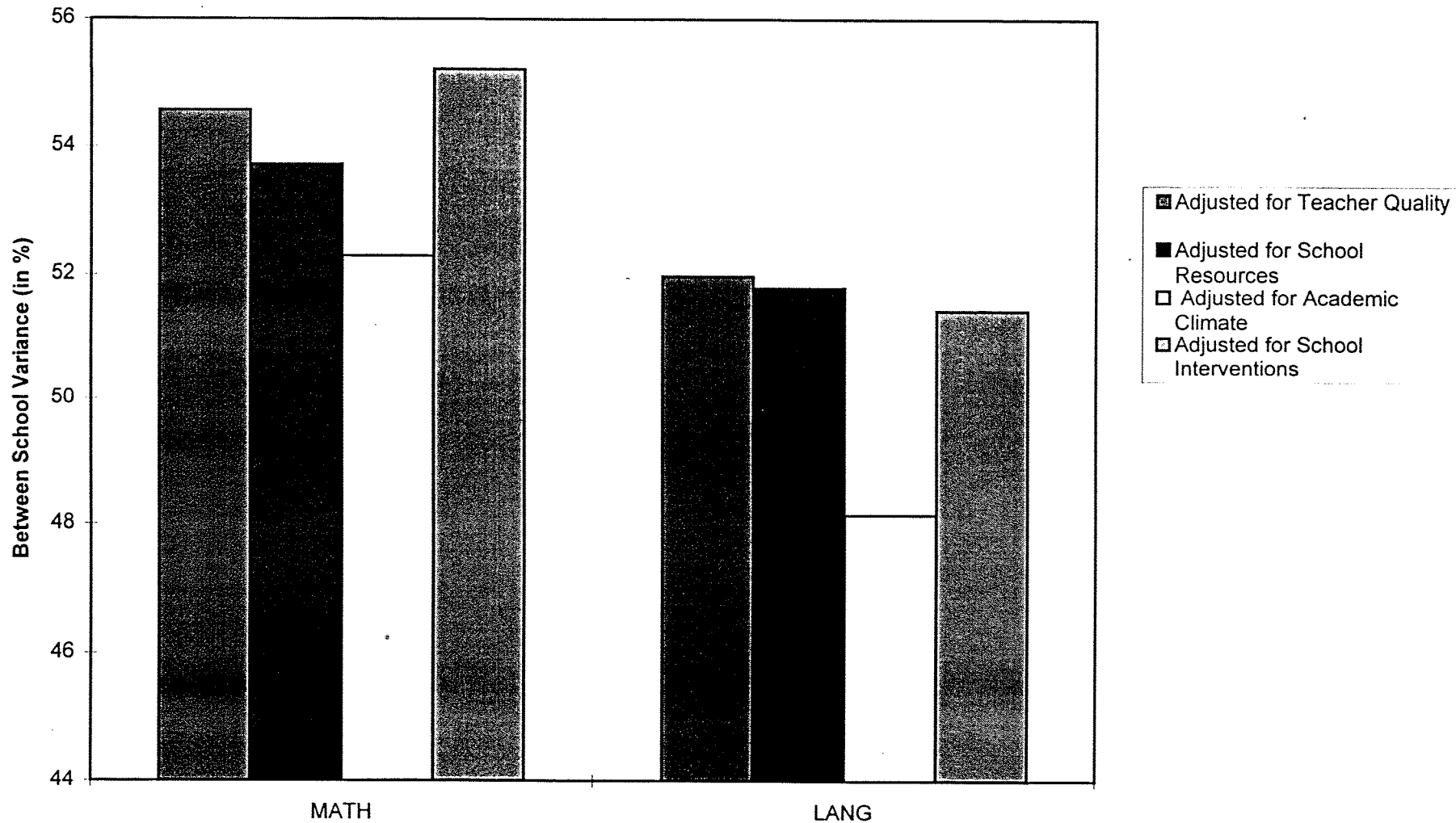
a) Effect of Teacher Quality :

The effect of different school variables on Mathematics and Language achievements were shown in Table 5. It was observed that the teacher qualification and teacher experience have statistically significant negative association with Mathematics achievement. Even though the variables have negative association in case of language achievement but these were not significant. This has led to the conclusion that higher the qualification poorer was the school achievement. Similarly, the results were led to the conclusion that if the years of experience was longer, poorer the school mean achievement.

b) School Resources :

The factors which significantly contribute to Mathematics achievement were schools with higher than primary classes availability. Material, physical facilities and number of teachers. Three factors significantly contributing to language achievement were schools with higher than primary classes, number of teachers and availability of teaching material. The higher the percentage of female teachers, the better was the achievement in Mathematics. Higher pupil-teacher ratio brought the low achievement in both Mathematics and language. The achievement in schools with only primary classes was 4.1% below than the others regarding Mathematics and 29.4% in case of language. If the number of teachers were more (as in case of schools with higher classes), better was the teaching of language in schools.

Between School Variance Adjusted for Teacher Quality , School Resorces , Academic Climate  
and School Interventions



c) Academic Climate :

The Table 5 has indicated that the important factors which significantly contribute for school achievement in Mathematics were teacher asking to read and giving dictation, teacher giving test and feedback, doing home work, teacher assigning and correcting homework and teacher coming to class regularly. Asking to read and giving dictation has got significantly negative association with Mathematics achievement. Also, parent-teacher meetings, reviewing classes by head-teacher have negative association with Mathematics achievement.

**Table 5 : Effect of School Level Variables on Achievement in Mathematics and Language**

School level variable	Mathematics		Language	
	Coefficient	Standard Error	Coefficient	Standard Error
TCHQUA	-0.1035*	0.0397	-0.0132	0.0391
TCHEXP	-0.0106**	0.0076	-0.0022	0.0075
STABLE	-0.0088	0.0108	0.0005	0.0107
INSERVIC	0.2691	0.2741	-0.1129	0.2701
PRIMARY	-0.0413	0.4224	-0.2941	0.4124
FACILED	-0.0005	0.0220	-0.0188	0.0215
FACILPH	0.0136	0.0266	-0.0091	0.0261
NUMTCH	0.0125	0.0574	0.1068*	0.0561
PTRATIO	-0.0056*	0.0019	-0.0034*	0.0019
PCTFEMT	0.0028*	0.0014	0.0014	0.0014
MATERIAL	0.0326	0.0329	0.0472**	0.0321
PRNTINV	-0.0406	0.0631	-0.0197	0.0614
HMLEADER	-0.0480	0.0441	0.0161	0.0429
PRESSLNG	-0.3913*	0.2137	0.1729	0.2078
PRESSMTH	-0.0216	0.2270	0.0019	0.2209
PRESSTST	0.3612*	0.1139	0.2272*	0.1107
PRESSTHW	0.2647**	0.2409	0.2866**	0.2345
PRESSPHW	0.1363*	0.0849	0.0867**	0.0826
COMMIT	0.1253**	0.1078	-0.0758	0.1046
FACILOP	0.0231	0.0122	0.0028	0.0118
MDMEAL	-0.0001	0.0013	0.0004	0.0012
UNIFORM	0.0013	0.0014	0.0011	0.0014
TXTBOOK	-0.0011	0.0018	-0.0024**	0.0017
SRATTEND	-0.0011	0.0019	0.0030*	0.0019
OSCHOLAR	0.0002	0.0025	0.0013	0.0024
OPBLACK	-0.1161	0.1293	-0.1874**	0.1248

\* Significant at 10% level, \*\* Significant at 20% level

Teacher giving test and feedback, asking and correcting homework, doing homework have got significant positive association with the language achievement. Parent-teacher meetings has negative association with language achievement. Giving tests and feedback has significantly contributed to both Mathematics and Language Achievements.

#### **Effect of State Interventions on Achievement :**

##### **a) Impact of OB scheme :**

It was observed (from Table 5) that the introduction of OB scheme brought down the school achievement. This effect was significant in language achievement only. This might be due to the improper implementation of the scheme. Actual reasons should be investigated further.

##### **b) Incentive Schemes :**

Except scholarship for attendance and Textbook schemes, the other schemes have no significant effect on achievement. Further these two schemes had significant effect on language achievement only.

#### **Effect of School Level Variables on Gender Achievement Gap :**

The achievement difference between boys and girls (gender achievement gap) has been studied in relation to the school level factors. For this purpose, girl achievement slope has been analysed to estimate the effect of school level variables. The results of the analysis for the teacher quality, school resources and school academic climate are presented in Table 6.

a) **Teacher Quality Variables :**

Table 6 has indicated that longer stay in a school by a teacher has got positive statistically significant effect on Girls' achievement. This means that if the teacher stayed longer period in a school, the gender gap in the achievement of Mathematics is less. No teacher quality variable has reduced the gender gap in language achievement.

**Table 6: Effect of School Level Variables on Gender Achievement Gap**

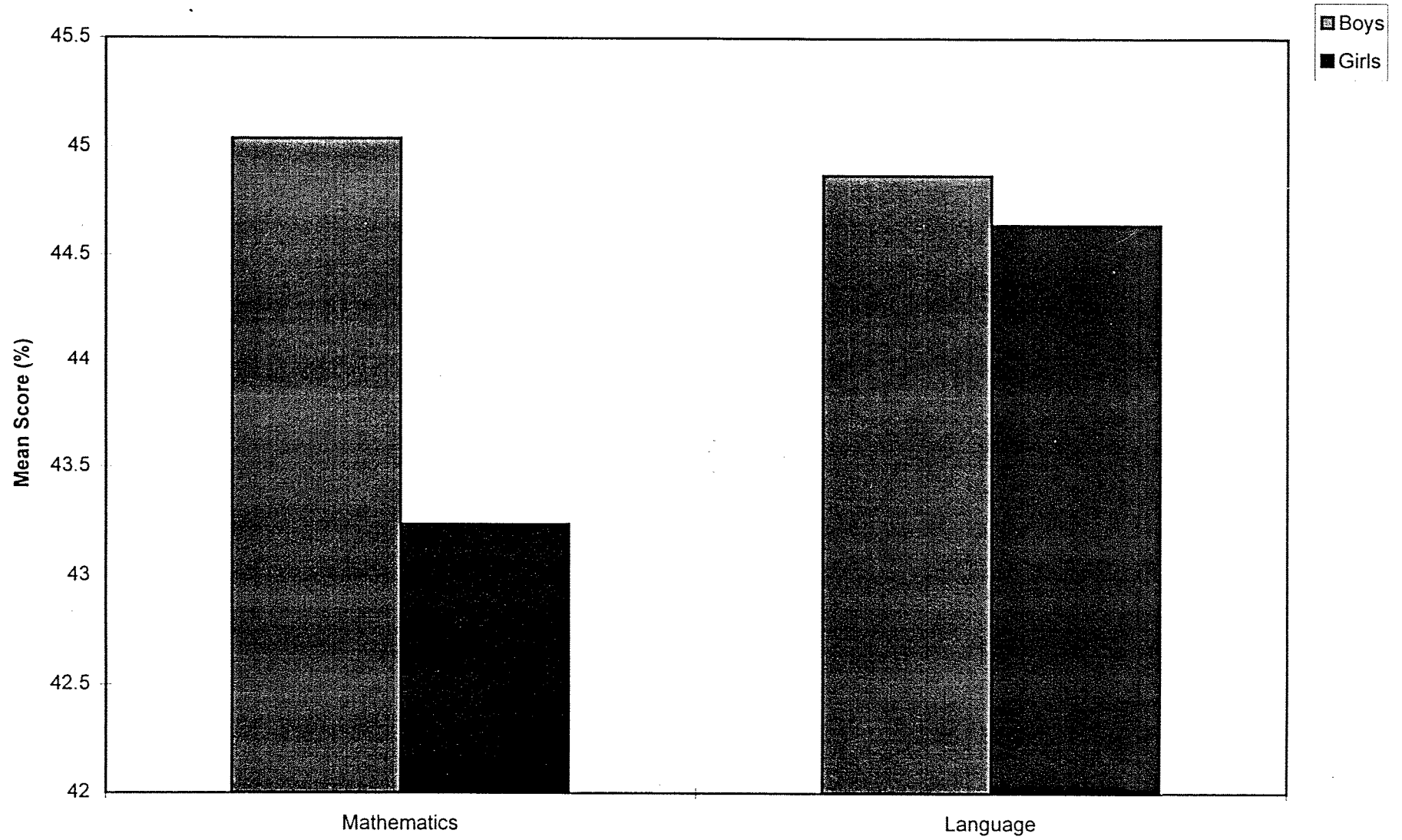
School level variable	Mathematics		Language	
	Coefficient	Standard Error	Coefficient	Standard Error
TCHQUA	0.0401	0.0331	0.0079	0.0280
TCHEXP	0.0041	0.0064	0.0048	0.0055
STABLE	0.0119**	0.0095	-0.0004	0.0082
INSERVIC	-0.0135	0.2214	0.1109	0.1857
MEANSES	-0.1460*	0.0833	-0.0838**	0.0691
PCTSCST	-0.0018**	0.0013	0.0008	0.0011
PRIMARY	-0.1644	0.2927	-0.1261	0.2262
FACILED	-0.0065	0.0181	0.0090	0.0151
FACILPH	-0.0217	0.0210	0.0251**	0.0172
NUMTCH	-0.0246	0.0445	-0.0597*	0.0361
PTRATIO	-0.0010	0.0016	-0.0009	0.0014
PCTFEMT	0.0012	0.0012	-0.0002	0.0010
MATERIAL	-0.0159	0.0269	-0.0360	0.0224
PRNTINV	-0.0563	0.0525	-0.0505	0.0448
HMLEADER	-0.0556**	0.0374	-0.0381	0.0326
PRESSLNG	0.3302*	0.1734	0.0436	0.1484
PRESSMTH	-0.3100*	0.1882	0.0530	0.1622
PRESSTST	0.0862	0.0956	0.0453	0.0819
PRESSTHW	-0.3662*	0.1995	-0.1708	0.1712
PRESSPHW	-0.0228	0.0783	-0.0275	0.0688
COMMIT	0.2034*	0.1014	0.0033	0.0884
FACILOP	-0.0163*	0.0094	0.0004	0.0079
MDMEAL	-0.0013**	0.0010	-0.000005	0.0008
UNIFORM	0.0006	0.0011	0.0005	0.0009
TXTBOOK	0.0010	0.0014	-0.0006	0.0012
SRATTEND	-0.0012	0.0015	0.0008	0.0013
OSCHOLAR	0.0005	0.0019	0.0014	0.0016
OPBLACK	-0.0582	0.0975	0.0182	0.0804

\* Significant at 10% level

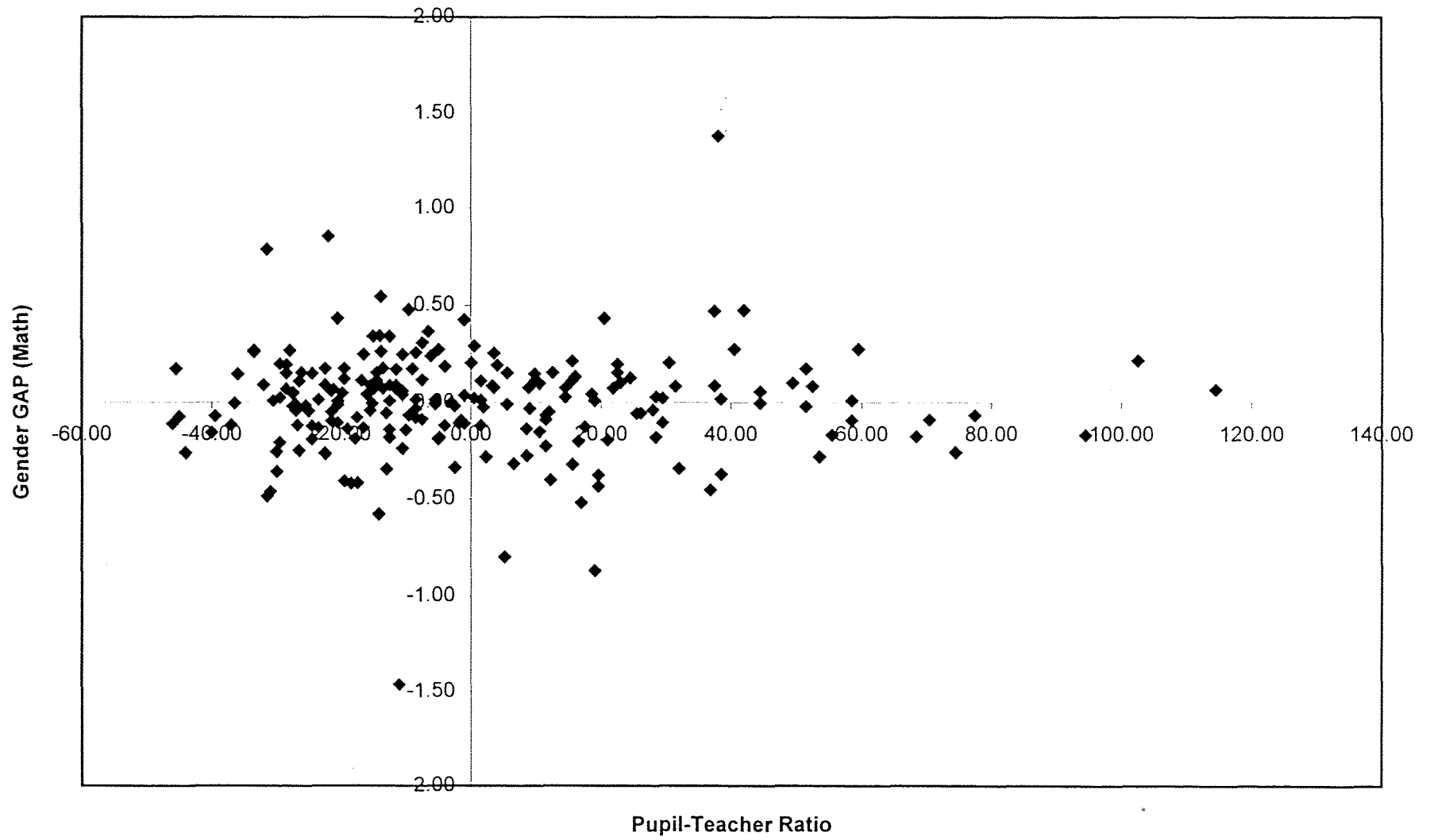
\*\* Significant at 20% level



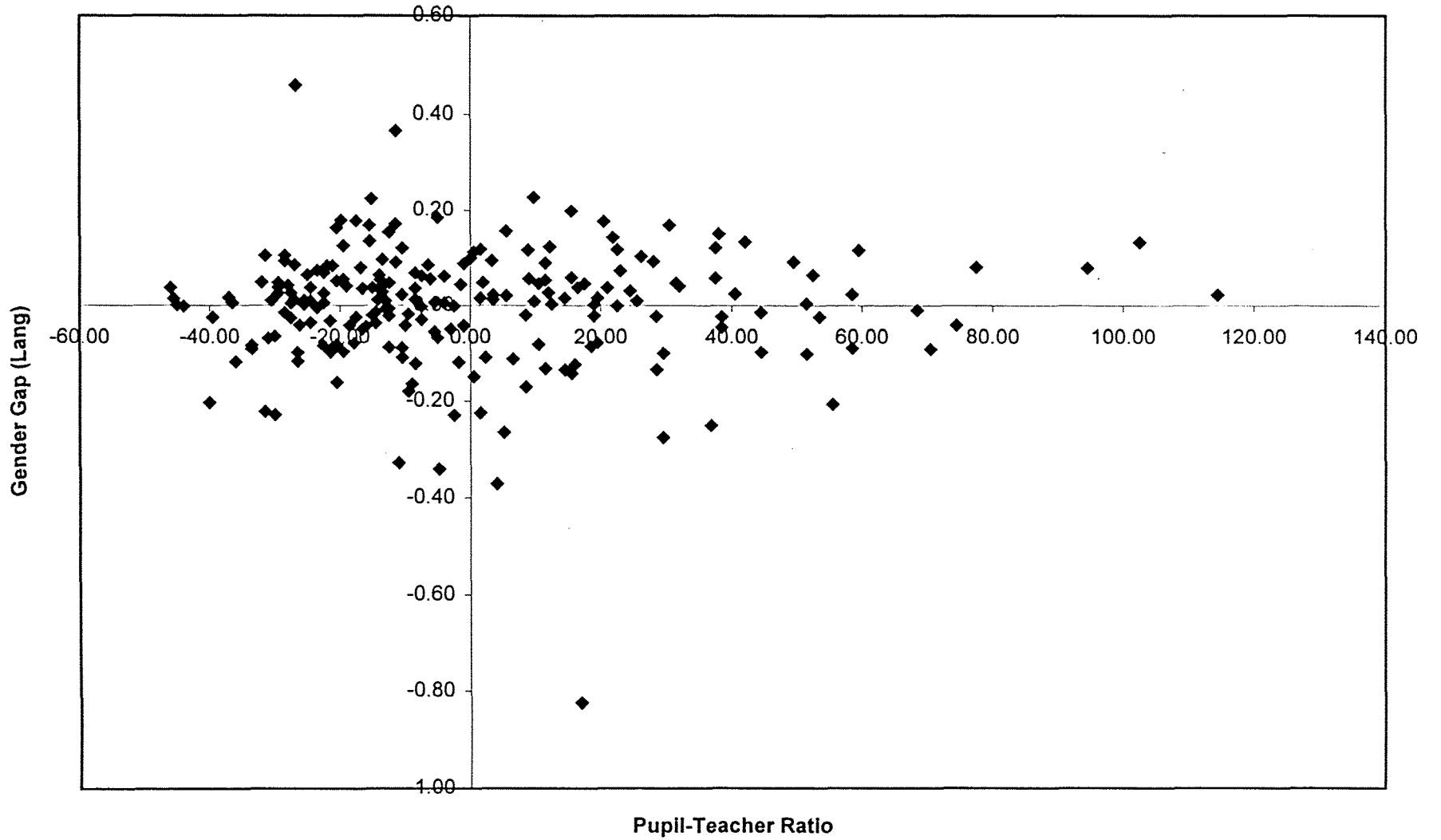
Mean Scores of Boys and Girls



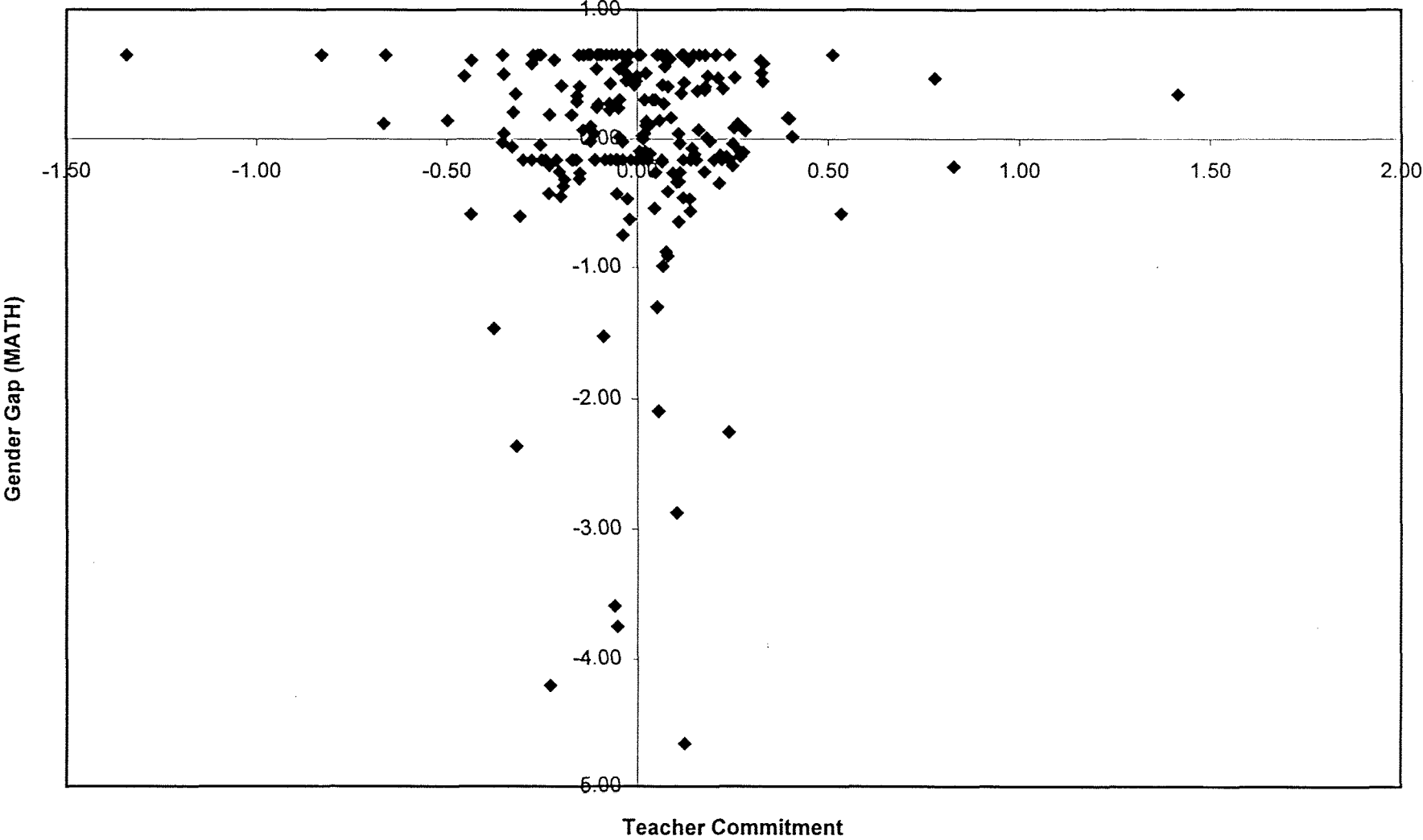
Effect of Pupil-Teacher Ratio on Gender Achievement Gap



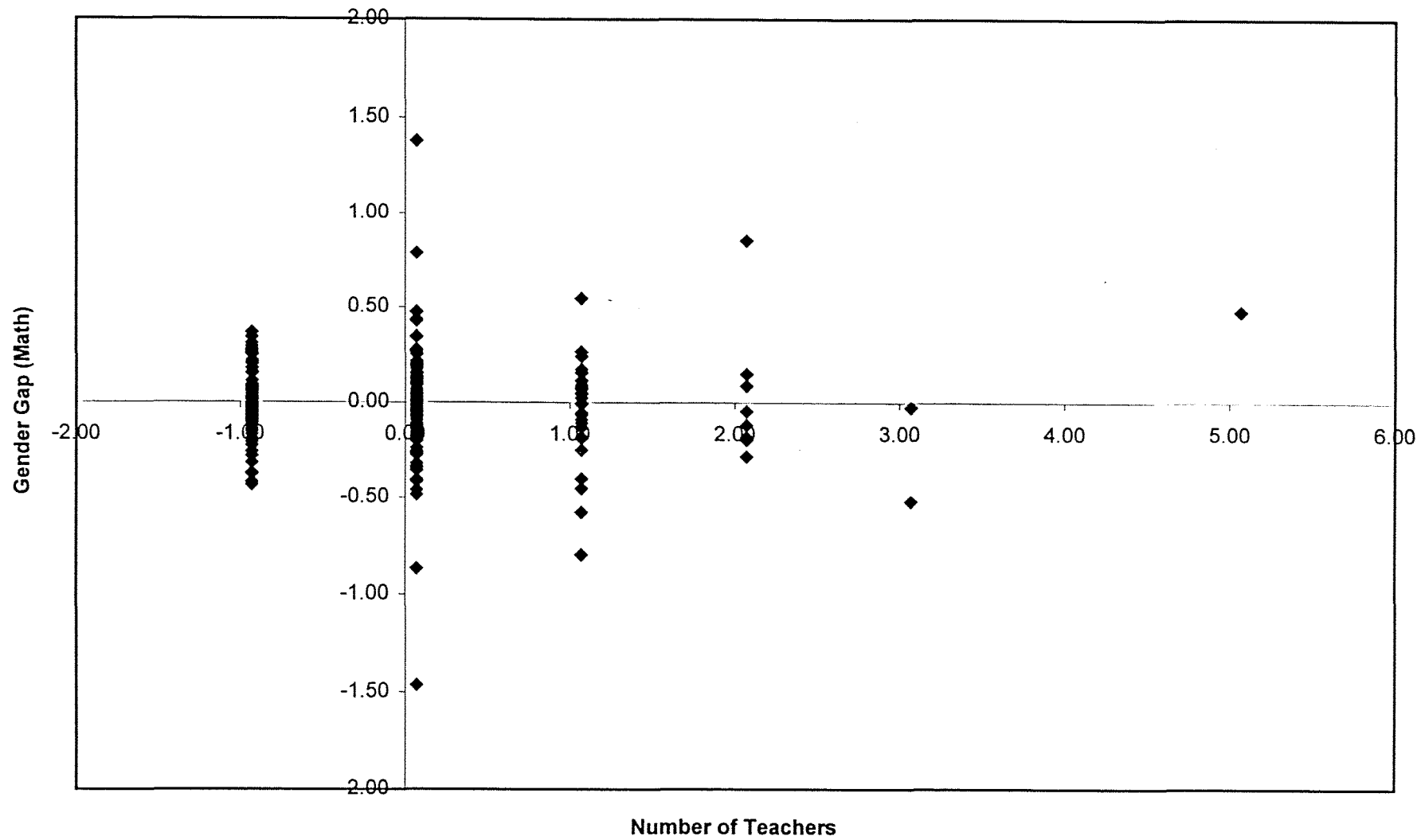
Effect of Pupil-Teacher Ratio on Gender Achievement Gap (Lang)



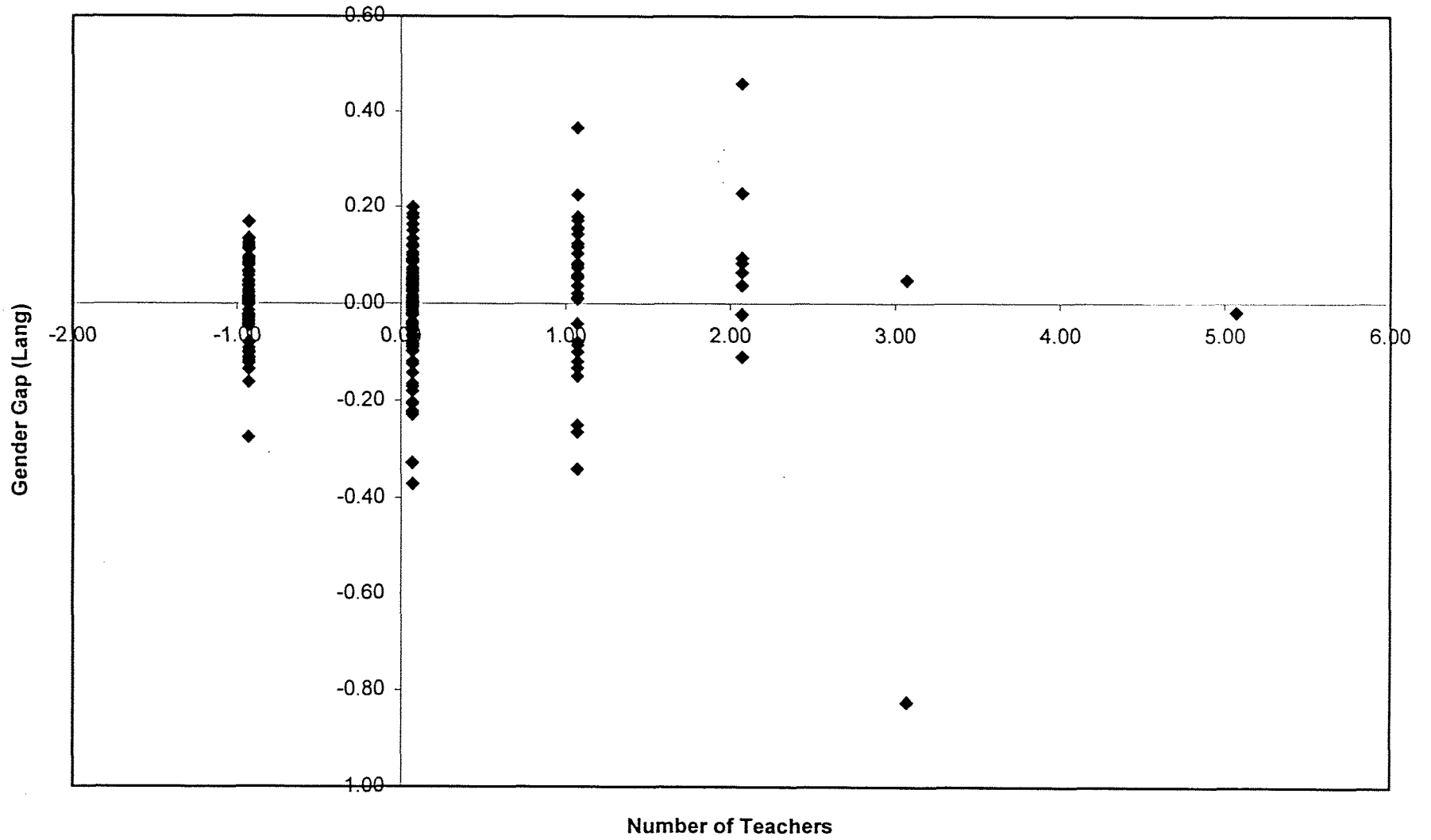
Effect of Teacher Commitment on Gender Achievement Gap



Effect of Number of Teachers on Gender Achievement Gap



Effect of Number of Teachers on Gender Achievement Gap



**b) School Resources :**

No variable could significantly contribute to reduce the gender gap in Mathematics achievement. In case of language achievement physical facilities have got some effect in reducing the gender gap where as the number of teachers and availability of materials were responsible to increase the gap.

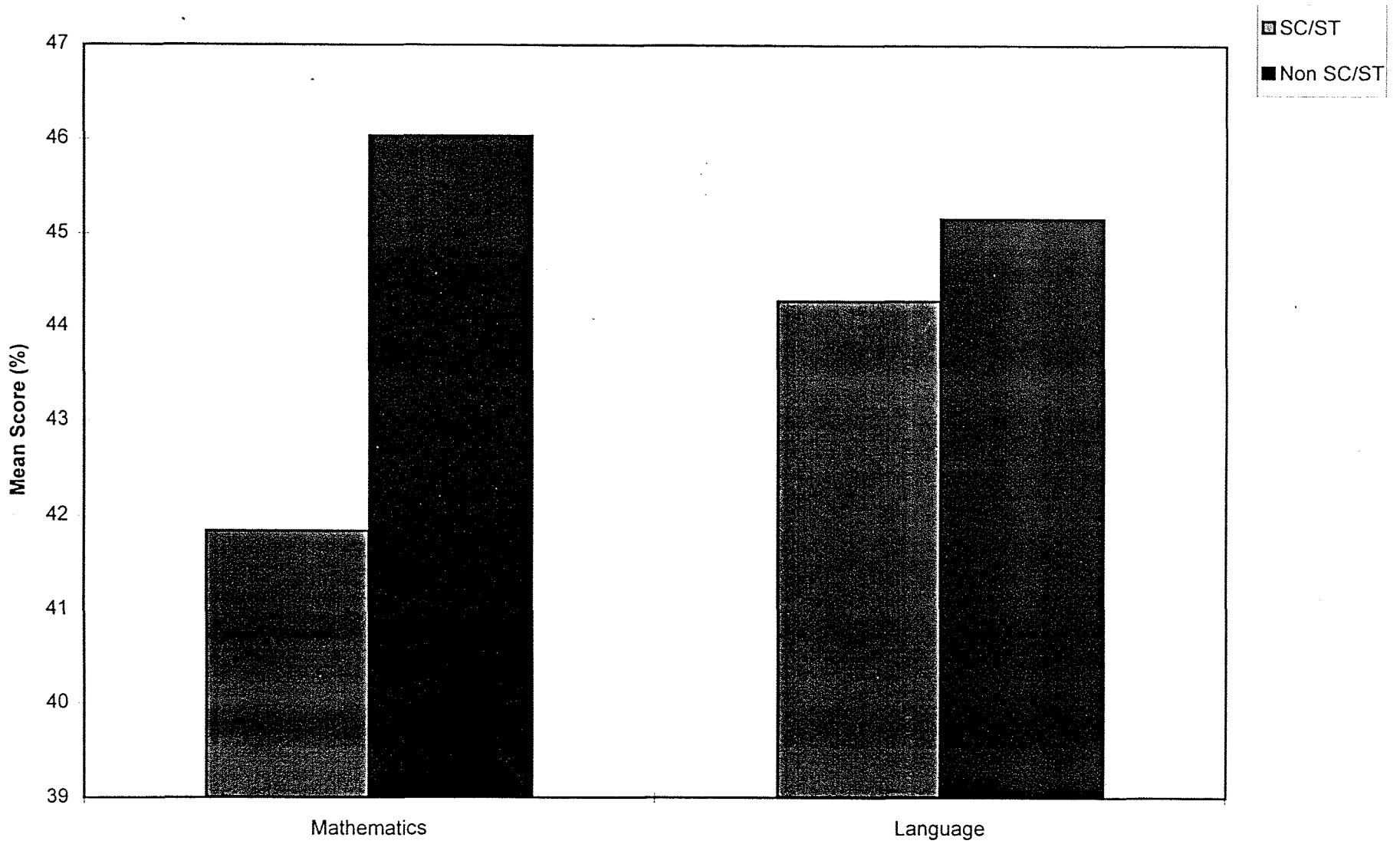
**c) Academic Climate :**

Teachers asking to read and giving dictation and teacher continuity in the same school have got positive association with girls' achievement in Mathematics and hence reduced the gender gap. But teacher giving mathematics problems to solve in class, teachers' assignment for homework and reviewing the performance of the teacher by Head teacher did increase the gender gap in case of Mathematics achievement. In case of language achievement academic climate has no effect in reducing the gender gap.

**Effect of School Level Variables on Achievement Gap between SC/ST and Non-SC/ST :**

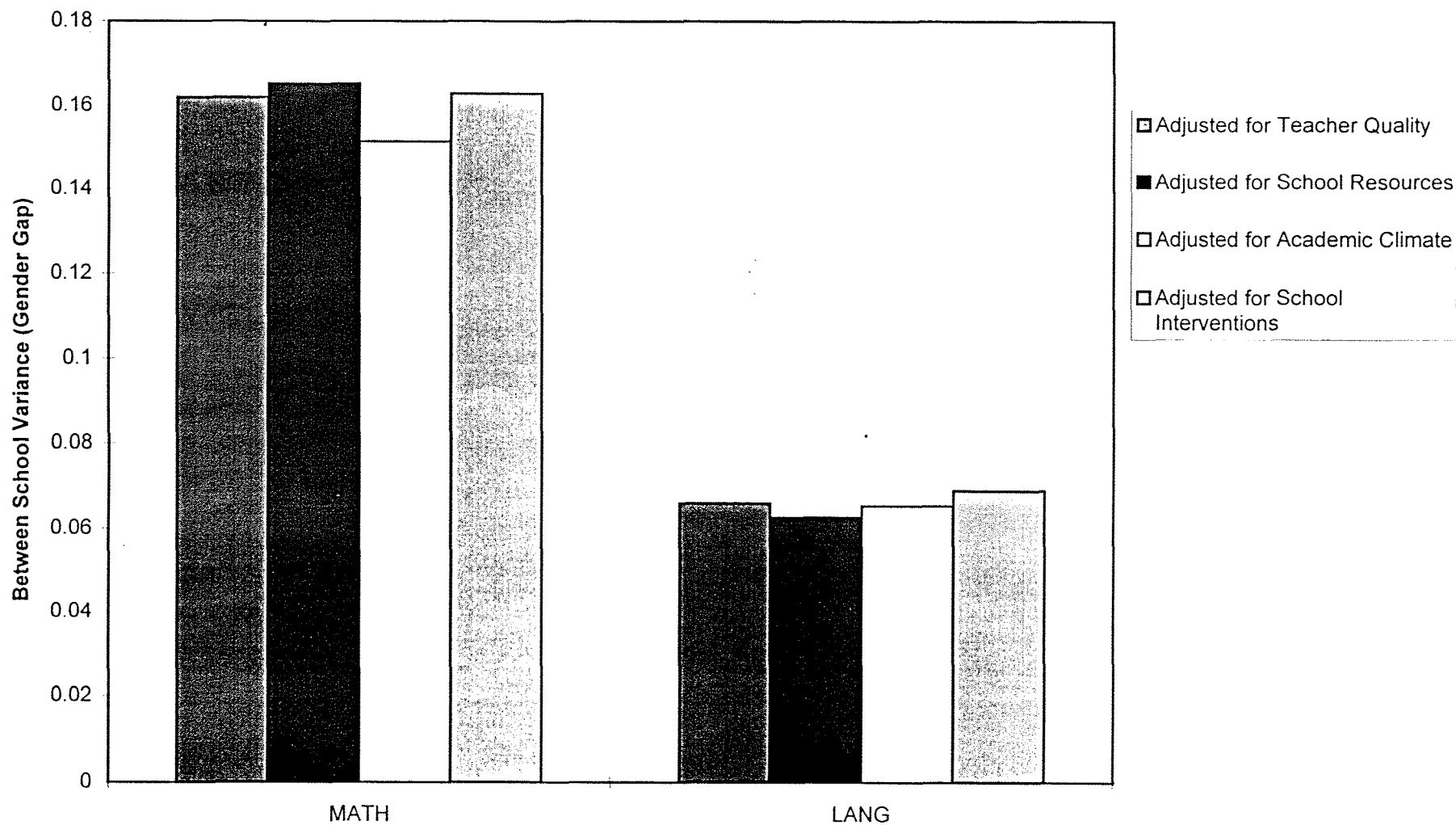
The important factors which reduce the mathematics achievement gap between SC/ST and Non-SC/ST are educational facilities, pupil-teacher ratio and percentage of female teachers. The variables like physical facilities helped in increasing the SC/ST gap in Mathematics achievement. In case of language, only the pupil-teacher ratio and percentage of female teachers could reduce the gap between the two groups.

Mean Scores of SC/ST and Non SC/ST

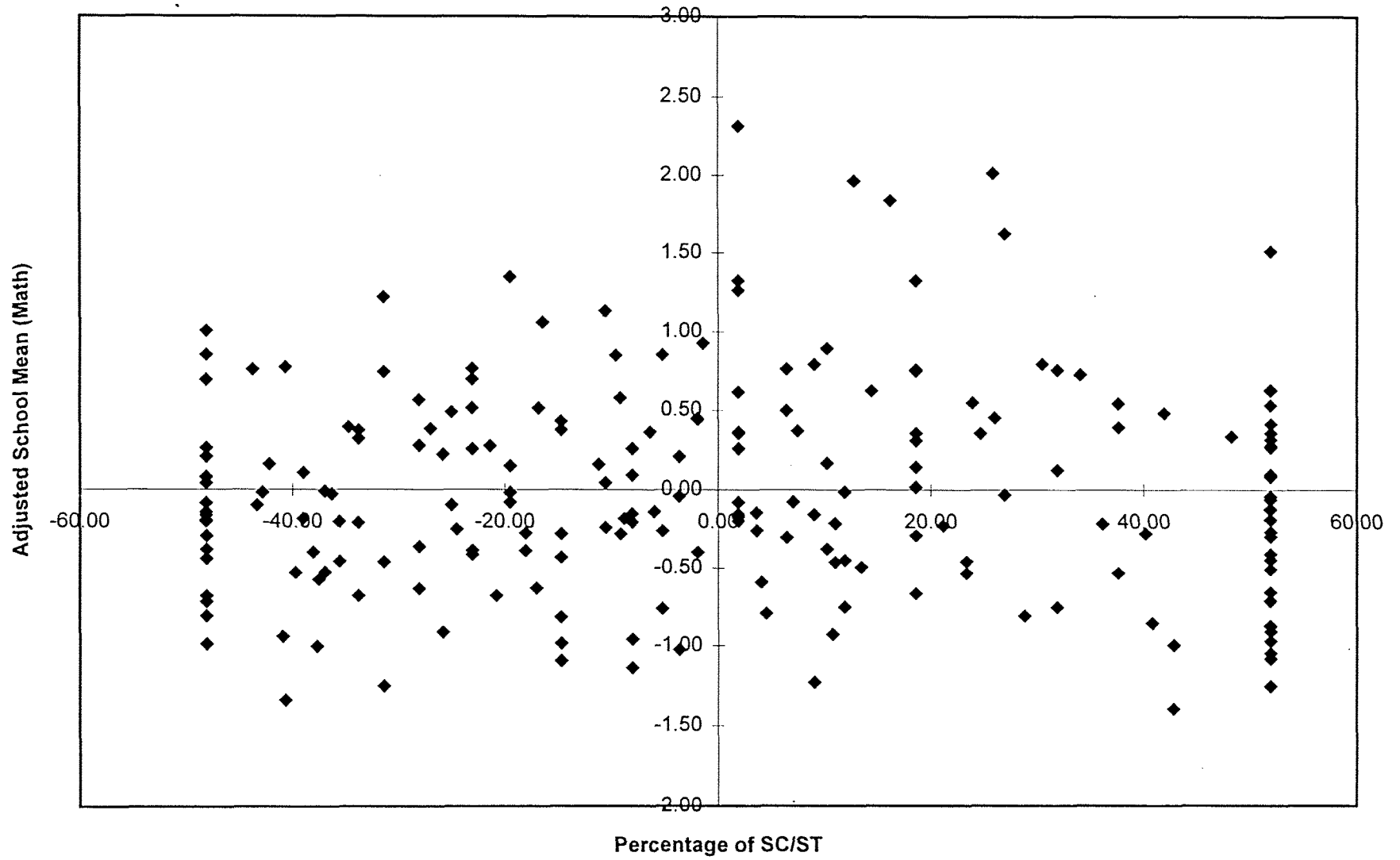




Between School Variance for Gender Gap Adjusted for Teacher Quality , School Resorces , Academic Climate and School Interventions



Adjusted School Mathematics Mean Versus Percentage of SC/ST



**Table 7 : Effect of School Level Variables on SC/ST Achievement Gap**

School level variable	Mathematics		Language	
	Coefficient	Standard Error	Coefficient	Standard Error
TCHQUAL	0.0171	0.0298	0.0092	0.0280
TCHEXP	0.0018	0.0059	-0.0036	0.0056
STABLE	-0.0026	0.0105	0.0052	0.0098
INSERVIC	0.1344	0.2136	-0.1036	0.2013
MEANSES	-0.1209*	0.0743	-0.0253	0.0688
PCTSCST	-0.0002	0.0018	0.0024**	0.0017
PRIMARY	0.0677	0.1971	0.0337	0.2067
FACILED	0.0245*	0.0153	0.0188	0.0158
FACILPH	-0.0222**	0.0175	-0.0058	0.0181
NUMTCH	0.0035	0.0359	0.0175	0.0369
PTRATIO	0.0029*	0.0014	0.0024*	0.0014
PCTFEMT	0.0018*	0.0010	0.0022*	0.0011
MATERIAL	0.0253	0.0229	-0.0064	0.0237
PRNTINV	0.0412	0.0498	0.0176	0.0506
HMLEADER	-0.0312	0.0353	0.0171	0.0361
PRESSLNG	0.0372	0.1615	-0.0674	0.1657
PRESSMTH	-0.2008	0.1786	0.1215	0.1837
PRESSTST	0.1089	0.0810	0.0006	0.0831
PRESSTHW	0.0702	0.1852	-0.0917	0.1905
PRESSPHW	-0.0445	0.0718	-0.0918	0.0736
COMMIT	-0.0188	0.0946	-0.0465	0.0963
FACIOP	0.0149	0.0085	0.0100	0.0086
MDMEAL	-0.0004	0.0009	-0.0018*	0.0009
UNIFORM	0.0003	0.0010	0.0009	0.0010
TXTBOOK	0.0001	0.0013	0.0020**	0.0013
SRATTEND	0.0011	0.0014	-0.0006	0.0014
OSCHOLAR	0.00004	0.0019	-0.0023	0.0019
OPBLACK	-0.0709	0.0860	-0.0392	0.0860

\* Significant at 10% level

\*\* Significant at 20% level

### **Summary of Findings :**

1. The pupils' achievement in Mathematics and language vary substantially within as well as between schools.
2. The between school variance was more than the within school variance in both Mathematics and Language achievements.
3. The performance of girls was comparatively lower (about 5.6% in Maths and 4.1% in Language) than that of boys.
4. The performance difference between boys and girls varied across schools.
5. SC/ST students have lower achievement (more than 9.6% in Maths and 5.3% in Language) when compared to Non-SC/ST students.
6. Parents education and father's occupation were found to be positively associated with pupils' achievement and were not so significant.
7. The repeaters performance was low in case of language achievement.
8. The MEANSES has positive association with the achievement of Mathematics and Language.
9. The percent SC/ST has negative association with the school mean achievement in Mathematics and Language.
10. Teacher qualification and Teacher experience have negative association with both Mathematics and Language achievement. It means that longer the teaching experience lower was the school mean achievement. Also higher qualified teachers could not produce better achievement.
11. The duration of stay of a teacher in the present school has indicated a positive association with the school mean achievement in Language and negative association with Mathematics achievement.

12. Percentage of female teachers has positive association with Mathematics achievement whereas the number of teachers has positive association with language achievement.
13. Higher Pupil-Teacher ratio has got negative association with school average achievement.
14. Giving tests and feedback and doing homework by pupil could effect the school achievement.
15. Only awarding scholarship for attendance has got positive association with language achievement whereas supply of textbook scheme and supply of material under Operation Blackboard scheme have negative association.
16. Most of the school variables like Primary, FACILED, FACILPH, NUMTCH, PTRATIO, MATERIAL were increasing the gender gap in case of Mathematics achievement whereas NUMTCH and MATERIAL were responsible for increase of gender gap in case of Language achievement.
17. Educational facilities, Pupil-Teacher ratio and percentage of Female-teachers were responsible to reduce the gap between SC/ST and Non-SC/ST in case of Mathematics achievement. Similarly, Pupil-Teacher ratio and percentage of female teachers were the factors to reduce the gap in language achievement of SC/ST and Non-SC/ST students.
18. On the whole state interventions did not have any significant impact in accelerating the achievement in schools.

## References

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2. Government of India, Ministry of Human Resource Development, Department of Education (1992). Programme of Action 1992.
3. Willms, J Douglas (1992). Monitoring School Performance: A Guide for Educators. The Falmer Press, London.
4. Saxena,R R, Satvir Singh and Gupta, J K (1996) Ed. School Effectiveness and Learners' Achievement at the Primary Stage, Vikas Publishing House Pvt Ltd.

## MODELS USED IN THE ANALYSIS

1. **Model 1**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$
2. **Model 2**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{GIRL}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
3. **Model 3**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{SCST}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
4. **Model 4**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{DADED}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
5. **Model 5**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{MUMED}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
6. **Model 6**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{DADOCC}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
7. **Model 7**  
 Level 1 :  $Y = B_0 + B_1 * (\text{REPEAT}) + R$   
 Level 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$
8. **Model 8**  
 Level - 1 :  $Y = B_0 + B_1 * (\text{SES}) + R$   
 Level - 2 :  $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$

9. **Model 9**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (TCHQUAL) + U_0$
10. **Model 10**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (TCHEXP) + U_0$
11. **Model 11**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (STABLE) + U_0$
12. **Model 12**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (INSERVIC) + U_0$
13. **Model 13**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (MEANSES) + U_0$
14. **Model 14**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (PCTSCST) + U_0$
15. **Model 15**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (PRNTINV) + U_0$
16. **Model 16**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (HMLEADER) + U_0$
17. **Model 17**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (PRESSLNG) + U_0$
18. **Model 18**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (PRESSMTH) + U_0$
19. **Model 19**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (PRESSTST) + U_0$



20. **Model 20**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (PRESSTHW) + U0$
21. **Model 21**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (PRESSPHW) + U0$
22. **Model 22**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (COMMIT) + U0$
23. **Model 23**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (FACILED) + U0$
24. **Model 24**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (FACILPH) + U0$
25. **Model 25**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (NUMTCH) + U0$
26. **Model 26**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (PTRATIO) + U0$
27. **Model 27**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (PCTFEMT) + U0$
28. **Model 28**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (MATERIAL) + U0$
29. **Model 29**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (PRIMARY) + U0$
30. **Model 30**  
 Level - 1 :  $Y = B0 + R$   
 Level - 2 :  $B0 = G00 + G01 * (MDMEAL) + U0$

31. **Model 31**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{UNIFORM}) + U_0$
32. **Model 32**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{TXTBOOK}) + U_0$
33. **Model 33**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{SRATTEND}) + U_0$
34. **Model 34**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{OSCHOLAR}) + U_0$
35. **Model 35**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{FACIOP}) + U_0$
36. **Model 36**  
 Level - 1 :  $Y = B_0 + R$   
 Level - 2 :  $B_0 = G_{00} + G_{01} * (\text{OPBLACK}) + U_0$
37. **Model 37**  
 Level - 1 :  
 $Y = B_0 + B_1 * (\text{GIRL}) + B_2 * (\text{SCST}) + B_3 * (\text{DADED})$   
 $+ B_4 * (\text{MUMED}) + B_5 * (\text{DADOCC}) + B_6 * (\text{REPEAT})$   
 $+ B_7 * (\text{SES}) + R$   
 Level - 2 :  
 $B_0 = G_{00} + U_0$   
 $B_1 = G_{10} + U_1$   
 $B_2 = G_{20} + U_2$   
 $B_3 = G_{30} + U_3$   
 $B_4 = G_{40} + U_4$   
 $B_5 = G_{50} + U_5$   
 $B_6 = G_{60} + U_6$   
 $B_7 = G_{70} + U_7$

38. **Model 38**  
 Level – 1 :  

$$Y = B_0 + B_1 * (\text{GIRL}) + B_2 * (\text{SCST}) + B_3 * (\text{DADED}) + B_4 * (\text{MUMED}) + B_5 * (\text{DADOCC}) + B_6 * (\text{REPEAT}) + B_7 * (\text{SES}) + R$$
- Level – 2 :  

$$B_0 = G_{00} + U_0$$

$$B_1 = G_{10}$$

$$B_2 = G_{20}$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

$$B_6 = G_{60}$$

$$B_7 = G_{70}$$
39. **Model 39**  
 Level – 1 :  

$$Y = B_0 + B_1 * (\text{GIRL}) + B_2 * (\text{SCST}) + B_3 * (\text{DADED}) + B_4 * (\text{MUMED}) + B_5 * (\text{DADOCC}) + B_6 * (\text{REPEAT}) + B_7 * (\text{SES}) + R$$
- Level – 2 :  

$$B_0 = G_{00} + G_{01} * (\text{MEANSES}) + G_{02} * (\text{PCTSCST}) + U_0$$

$$B_1 = G_{10} + U_1$$

$$B_2 = G_{20} + U_2$$

$$B_3 = G_{30}$$

$$B_4 = G_{40}$$

$$B_5 = G_{50}$$

$$B_6 = G_{60}$$

$$B_7 = G_{70}$$
40. **Model 40**  
 Level – 1 :  

$$Y = B_0 + B_1 * (\text{GIRL}) + B_2 * (\text{SCST}) + B_3 * (\text{DADED}) + B_4 * (\text{MUMED}) + B_5 * (\text{DADOCC}) + B_6 * (\text{REPEAT}) + B_7 * (\text{SES}) + R$$

Level – 2 :

$$\begin{aligned} B0 &= G00 + G01 * (TCHQUAL) + G02 * (TCHEXP) + \\ &G03 * (STABLE) + G04 * (INSERVIC) + G05 * \\ &(MEANSES) + G06 * (PCTSCST) + U0 \\ B1 &= G10 + U1 \\ B2 &= G20 + U2 \\ B3 &= G30 \\ B4 &= G40 \\ B5 &= G50 \\ B6 &= G60 \\ B7 &= G70 \end{aligned}$$

41. **Model 41**

Level – 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + \\ B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + \\ B7 * (SES) + R$$

Level – 2 :

$$\begin{aligned} B0 &= G00 + G01 * (TCHQUAL) + G02 * (TCHEXP) + \\ &G03 * (STABLE) + G04 * (INSERVIC) + G05 * \\ &(MEANSES) + G06 * (PCTSCST) + U0 \\ B1 &= G10 + G11 * (TCHQUAL) + G12 * (TCHEXP) + \\ &G13 * (STABLE) + G14 * (INSERVIC) + G15 * \\ &(MEANSES) + G16 * (PCTSCST) + U1 \\ B2 &= G20 + U2 \\ B3 &= G30 \\ B4 &= G40 \\ B5 &= G50 \\ B6 &= G60 \\ B7 &= G70 \end{aligned}$$

42. **Model 42**

Level – 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + \\ B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + \\ B7 * (SES) + R$$

Level – 2 :

$$\begin{aligned} B0 &= G00 + G01 * (TCHQUAL) + G02 * (TCHEXP) + \\ &G03 * (STABLE) + G04 * (INSERVIC) + G05 * \\ &(MEANSES) + G06 * (PCTSCST) + U0 \\ B1 &= G10 + G11 * (TCHQUAL) + G12 * (TCHEXP) + \\ &G13 * (STABLE) + G14 * (INSERVIC) + G15 * \\ &(MEANSES) + G16 * (PCTSCST) + U1 \end{aligned}$$

$$B2 = G20 + G21 * (TCHQUAL) + G22 * (TCHEXP) + G23 * (STABLE) + G24 * (INSERVIC) + G25 * (MEANSES) + G26 * (PCTSCST) + U2.$$

$$B3 = G30$$

$$B4 = G40$$

$$B5 = G50$$

$$B6 = G60$$

$$B7 = G70$$

43. **Model 43**

Level – 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level – 2 :

$$B0 = G00 + G01 * (PRIMARY) + G02 * (FACILED) + G03 * (FACILPH) + G04 * (NUMTCH) + G05 (PTRATIO) + G06 (PCTFEMT) + G07 * (MATERIAL) + G08 * (MEANSES) + G09 * (PCTSCST) + U0$$

$$B1 = G10 + U1$$

$$B2 = G20 + U2$$

$$B3 = G30$$

$$B4 = G40$$

$$B5 = G50$$

$$B6 = G60$$

$$B7 = G70$$

44. **Model 44**

Level – 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level – 2 :

$$B0 = G00 + G01 * (PRIMARY) + G02 * (FACILED) + G03 * (FACILPH) + G04 * (NUMTCH) + G05 (PTRATIO) + G06 (PCTFEMT) + G07 * (MATERIAL) + G08 * (MEANSES) + G09 * (PCTSCST) + U0$$

$$B1 = G10 + G11 * (PRIMARY) + G12 * (FACILED) +$$

$$G13 * (FACILPH) + G14 * (NUMTCH) + G15 * (PTRATIO) + G16 * (PCTFEMT) + G17 * (MATERIAL) +$$

$$G18 * (MEANSES) + G19 * (PCTSCST) + U1$$

$$B2 = G20 + U2$$

$$B3 = G30$$

$$B4 = G40$$

$$B5 = G50$$

$$B6 = G60$$

$$B7 = G70$$

45. **Model 45**  
Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level - 2 :

$$B0 = G00 + G01 * (PRIMARY) + G02 * (FACILED) + G03 * (FACILPH) + G04 * (NUMTCH) + G05 (PTRATIO) + G06 (PCTFEMT) + G07 * (MATERIAL) + G08 * (MEANSES) + G09 * (PCTSCST) + U0$$

$$B1 = G10 + G11 * (PRIMARY) + G12 * (FACILED) + G13 * (FACILPH) + G14 * (NUMTCH) + G15 * (PTRATIO) + G16 * (PCTFEMT) + G17 * (MATERIAL) + G18 * (MEANSES) + G19 * (PCTSCST) + U1$$

$$B2 = G20 + G21 * (PRIMARY) + G22 * (FACILED) + G23 * (FACILPH) + G24 * (NUMTCH) + G25 * (PTRATIO) + G26 * (PCTFEMT) + G27 * (MATERIAL) + G28 * (MEANSES) + G29 * (PCTSCST) + U2$$

$$B3 = G30$$

$$B4 = G40$$

$$B5 = G50$$

$$B6 = G60$$

$$B7 = G70$$

46. **Model 46**  
Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level - 2 :

$$B0 = G00 + G01 * (PRNTINV) + G02 * (HMLEADER) + G03 * (MEANSES) + G04 * (PCTSCST) + G05 * (PRESSLNG) + G06 * (PRESSMTH) + G07 * (PRESSTST) + G08 * (PRESSTHW) + G09 * (PRESSPHW) + G010 * (COMMIT) + U0$$

$$\begin{aligned}
B1 &= G10 + U1 \\
B2 &= G20 + U2 \\
B3 &= G30 \\
B4 &= G40 \\
B5 &= G50 \\
B6 &= G60 \\
B7 &= G70
\end{aligned}$$

47. **Model 47**

Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level - 2 :

$$\begin{aligned}
B0 &= G00 + G01 * (PRNTINV) + G02 * (HMLEADER) + G03 * (MEANSES) + G04 * (PCTSCST) + G05 * (PRESSLNG) + G06 * (PRESSMTH) + G07 * (PRESSTST) + G08 * (PRESSTHW) + G09 * (PRESSPHW) + G010 * (COMMIT) + U0 \\
B1 &= G10 + G11 * (PRNTINV) + G12 * (HMLEADER) + G13 * (MEANSES) + G14 * (PCTSCST) + G15 * (PRESSLNG) + G16 * (PRESSMTH) + G17 * (PRESSTST) + G18 * (PRESSTHW) + G19 * (PRESSPHW) + G110 * (COMMIT) + U1 \\
B2 &= G20 + U2 \\
B3 &= G30 \\
B4 &= G40 \\
B5 &= G50 \\
B6 &= G60 \\
B7 &= G70
\end{aligned}$$

48. **Model 48**

Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level - 2 :

$$\begin{aligned}
B0 &= G00 + G01 * (PRNTINV) + G02 * (HMLEADER) + G03 * (MEANSES) + G04 * (PCTSCST) + G05 * (PRESSLNG) + G06 * (PRESSMTH) + G07 * (PRESSTST) + G08 * (PRESSTHW) + G09 * (PRESSPHW) + G010 * (COMMIT) + U0
\end{aligned}$$

$$\begin{aligned}
B1 &= G10 + G11 * (PRNTINV) + G12 * (HMLEADER) + \\
&G13 * (MEANSES) + G14 * (PCTSCST) + G15 * \\
&(PRESSLNG) + G16 * (PRESSMTH) + G17 * \\
&(PRESSTST) + G18 * (PRESSTHW) + G19 * \\
&(PRESSPHW) + G110 * (COMMIT) + U1 \\
B2 &= G20 + G21 * (PRNTINV) + G22 * (HMLEADER) + \\
&G23 * (MEANSES) + G24 * (PCTSCST) + G25 * \\
&(PRESSLNG) + G26 * (PRESSMTH) + G27 * \\
&(PRESSTST) + G28 * (PRESSTHW) + G29 * \\
&(PRESSPHW) + G210 * (COMMIT) + U2 \\
B3 &= G30 \\
B4 &= G40 \\
B5 &= G50 \\
B6 &= G60 \\
B7 &= G70
\end{aligned}$$

49. **Model 49**

Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + \\
B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + \\
B7 * (SES) + R$$

Level - 2 :

$$\begin{aligned}
B0 &= G00 + G01 * (FACIOP) + G02 * (MDMEAL) + \\
&G03 * (UNIFORM) + G04 * (TXTBOOK) + G05 * \\
&(SRATTEND) + G06 * (OSCHOLAR) + G07 * \\
&(MEANSES) + G08 * (PCTSCST) + G09 * (OPBLACK) + \\
&U0 \\
B1 &= G10 + U1 \\
B2 &= G20 + U2 \\
B3 &= G30 \\
B4 &= G40 \\
B5 &= G50 \\
B6 &= G60 \\
B7 &= G70
\end{aligned}$$

50. **Model 50**

Level - 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + \\
B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + \\
B7 * (SES) + R$$



Level – 2 :

$$B0 = G00 + G01 * (FACIOP) + G02 * (MDMEAL) + G03 * (UNIFORM) + G04 * (TXTBOOK) + G05 * (SRATTEND) + G06 * (OSCHOLAR) + G07 * (MEANSES) + G08 * (PCTSCST) + G09 * (OPBLACK) + U0$$

$$B1 = G10 + G11 * (FACIOP) + G12 * (MDMEAL) + G13 * (UNIFORM) + G14 * (TXTBOOK) + G15 * (SRATTEND) + G16 * (OSCHOLAR) + G17 * (MEANSES) + G18 * (PCTSCST) + G19 * (OPBLACK) + U1$$

$$B2 = G20 + U2$$

$$B3 = G30$$

$$B4 = G40$$

$$B5 = G50$$

$$B6 = G60$$

$$B7 = G70$$

51. **Model 51**

Level – 1 :

$$Y = B0 + B1 * (GIRL) + B2 * (SCST) + B3 * (DADED) + B4 * (MUMED) + B5 * (DADOCC) + B6 * (REPEAT) + B7 * (SES) + R$$

Level – 2 :

$$B0 = G00 + G01 * (FACIOP) + G02 * (MDMEAL) + G03 * (UNIFORM) + G04 * (TXTBOOK) + G05 * (SRATTEND) + G06 * (OSCHOLAR) + G07 * (MEANSES) + G08 * (PCTSCST) + G09 * (OPBLACK) + U0$$

$$B1 = G10 + G11 * (FACIOP) + G12 * (MDMEAL) + G13 * (UNIFORM) + G14 * (TXTBOOK) + G15 * (SRATTEND) + G16 * (OSCHOLAR) + G17 * (MEANSES) + G18 * (PCTSCST) + G19 * (OPBLACK) + U1$$

$$B2 = G20 + G21 * (FACIOP) + G22 * (MDMEAL) + G23 * (UNIFORM) + G24 * (TXTBOOK) + G25 * (SRATTEND) + G26 * (OSCHOLAR) + G27 * (MEANSES) + G28 * (PCTSCST) + G29 * (OPBLACK) + U2$$

$$B3 = G30$$

$$B4 = G40$$

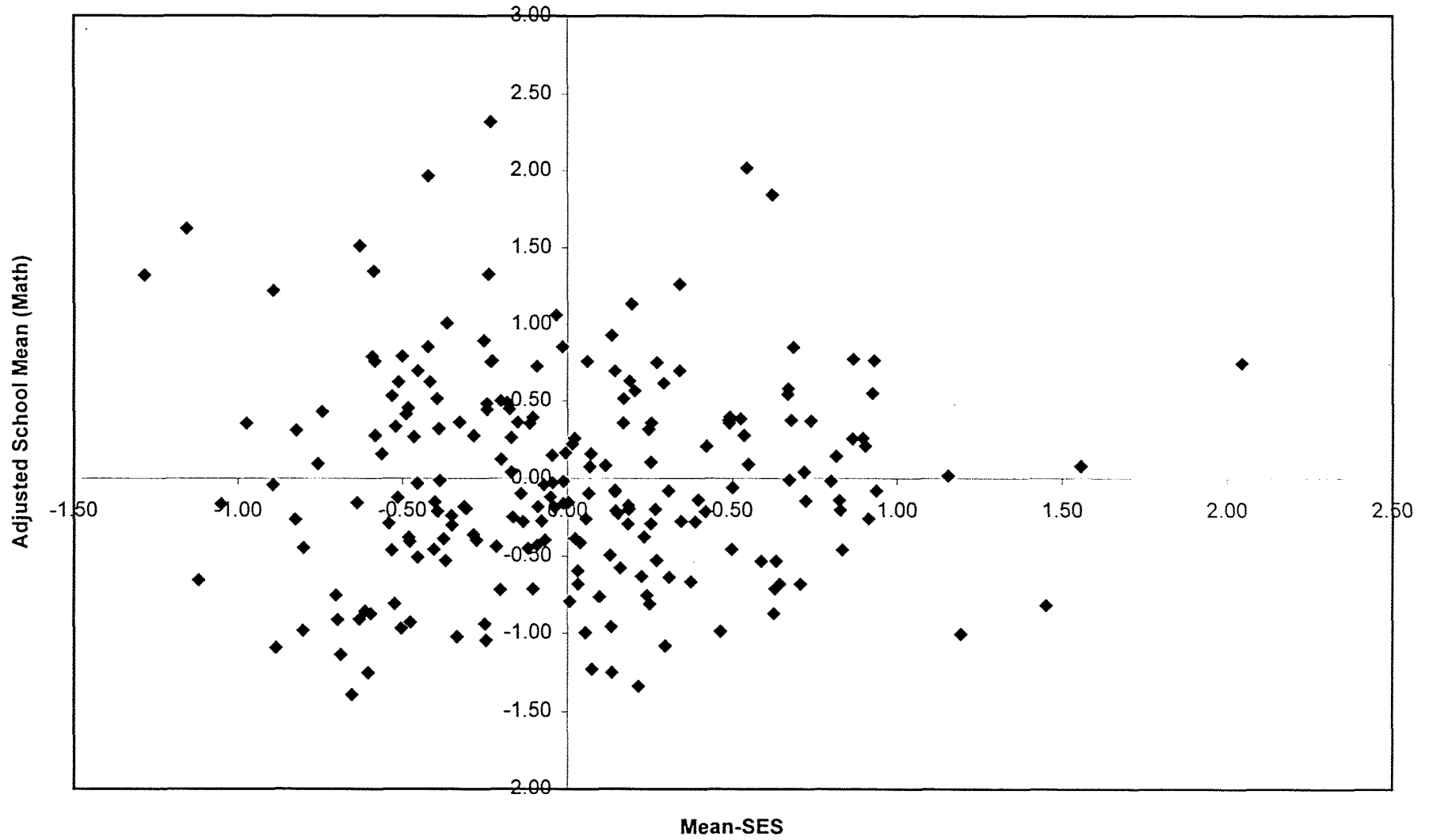
$$B5 = G50$$

$$B6 = G60$$

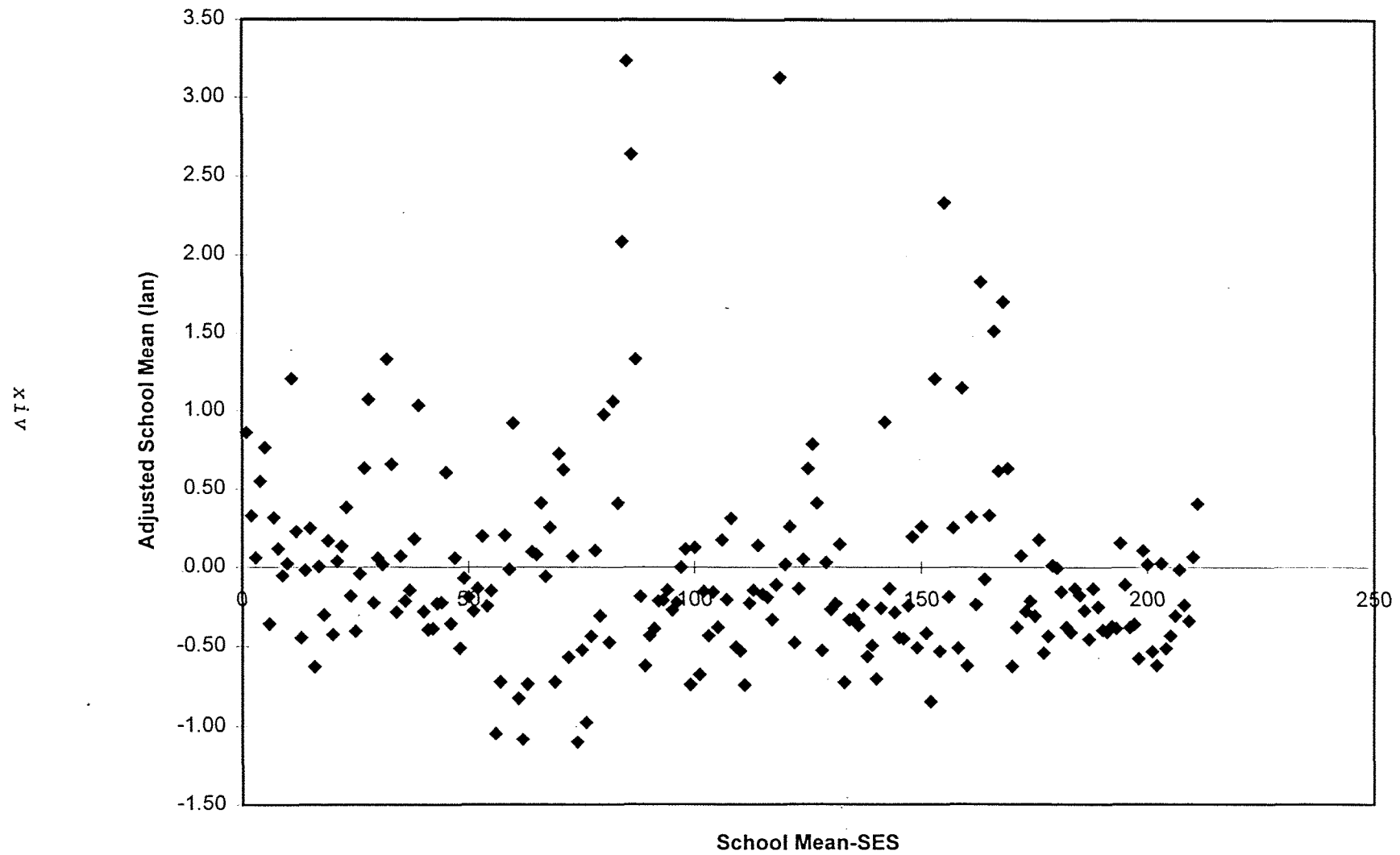
$$B7 = G70$$

## **ANNEXURE - 2**

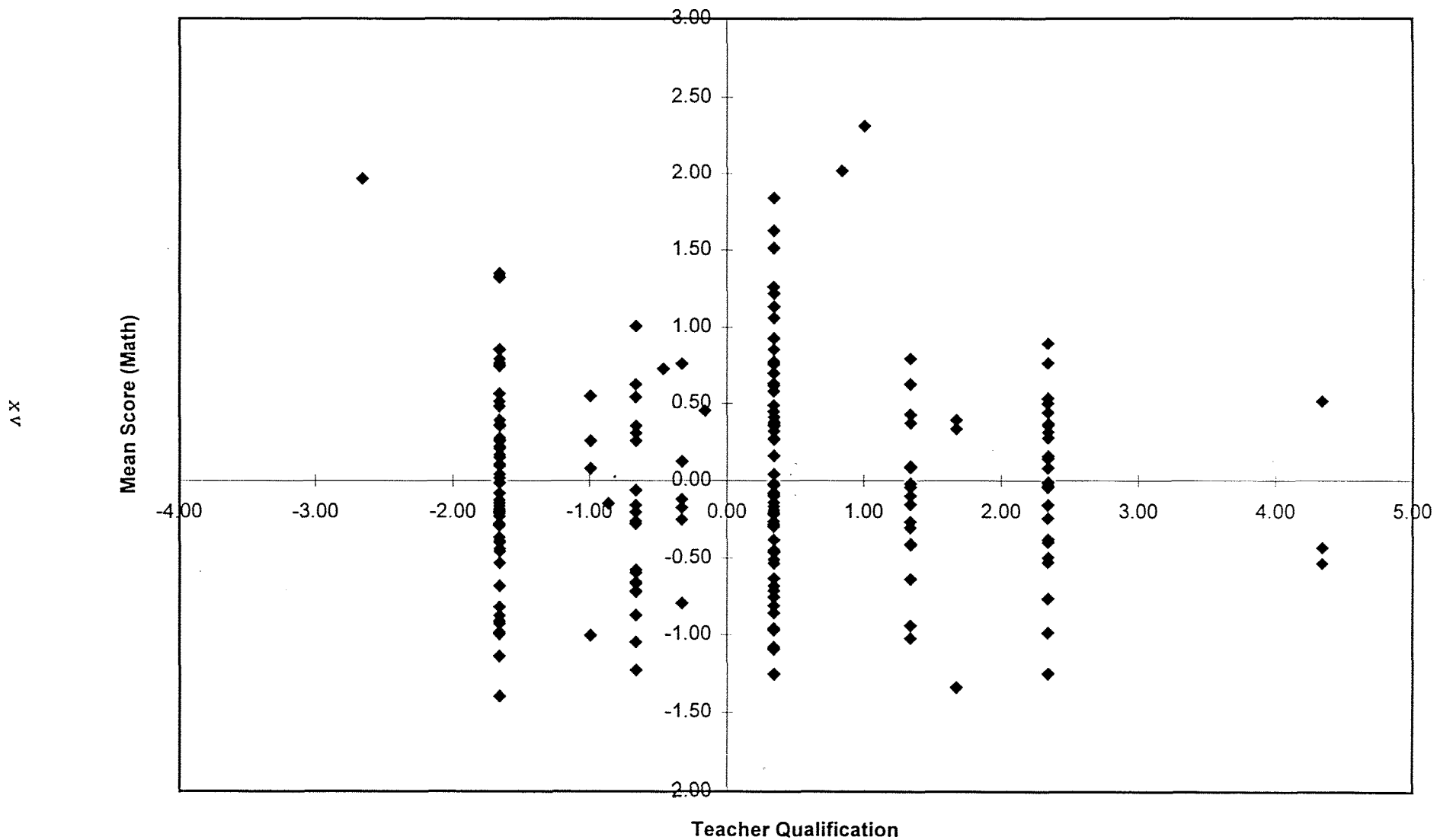
Adjusted School Mathematics Mean Versus Mean-SES



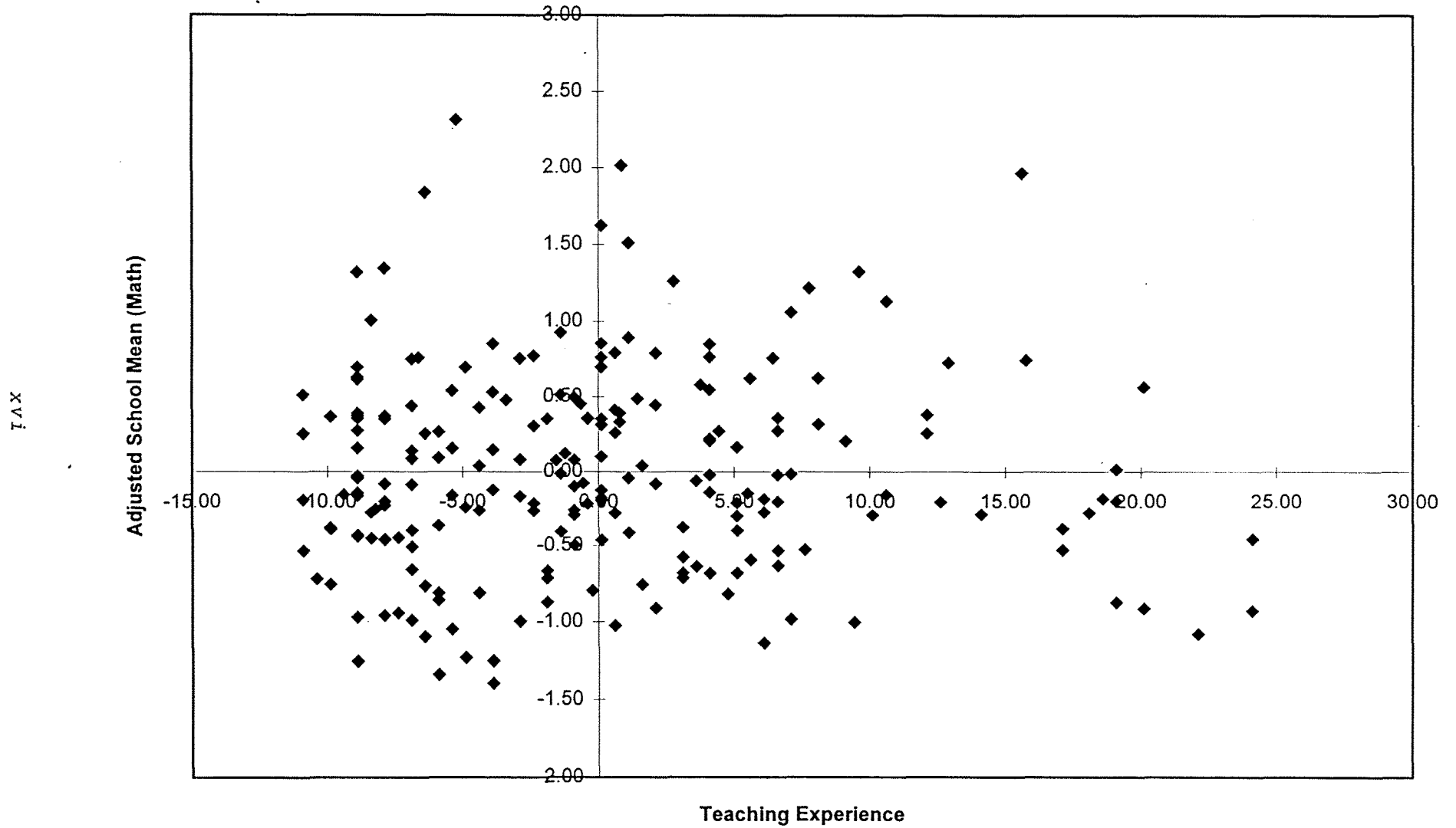
Adjusted School Language Mean Versus Mean-SES



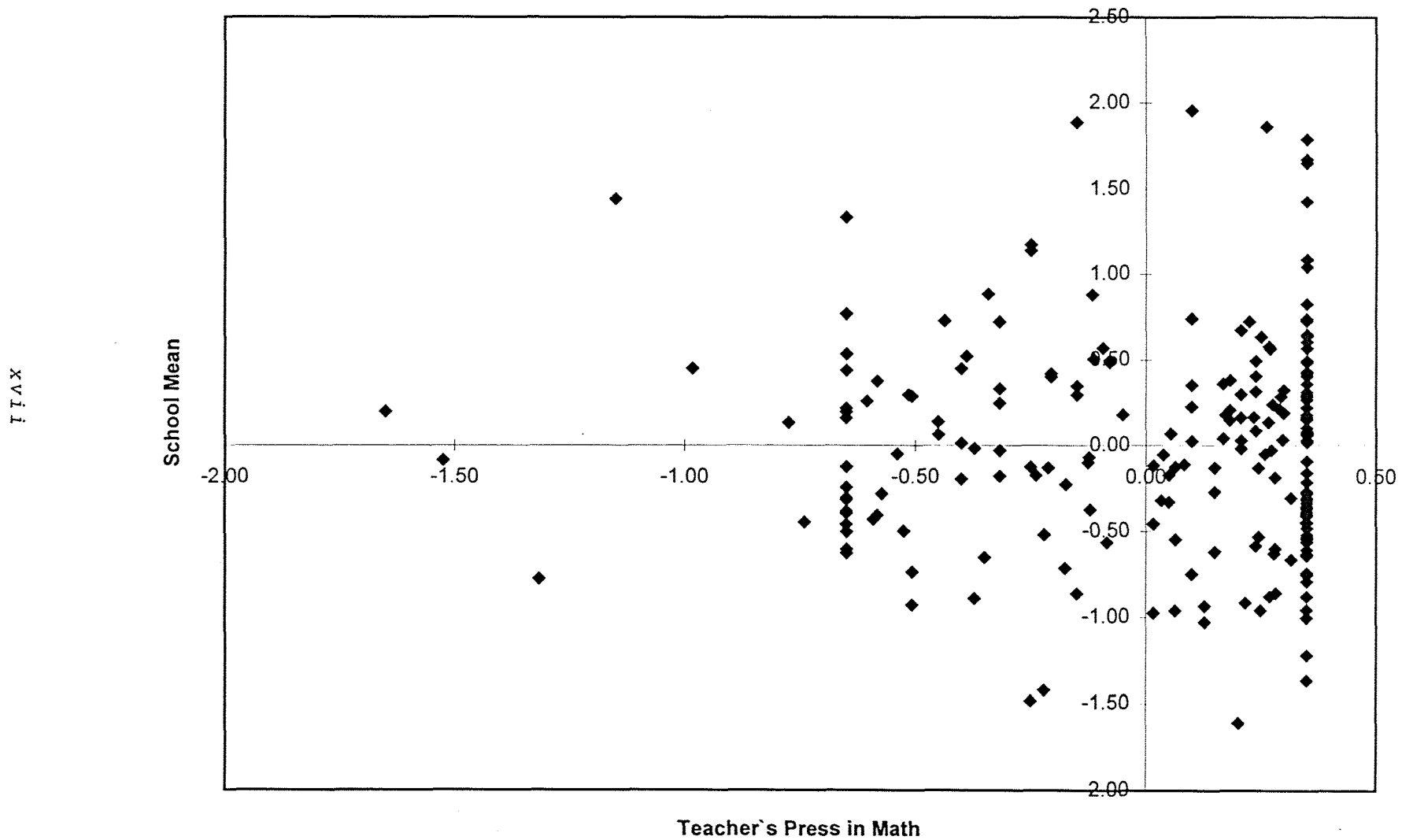
Adjusted School Mean in Mathematics VVersus Teacher Qualification



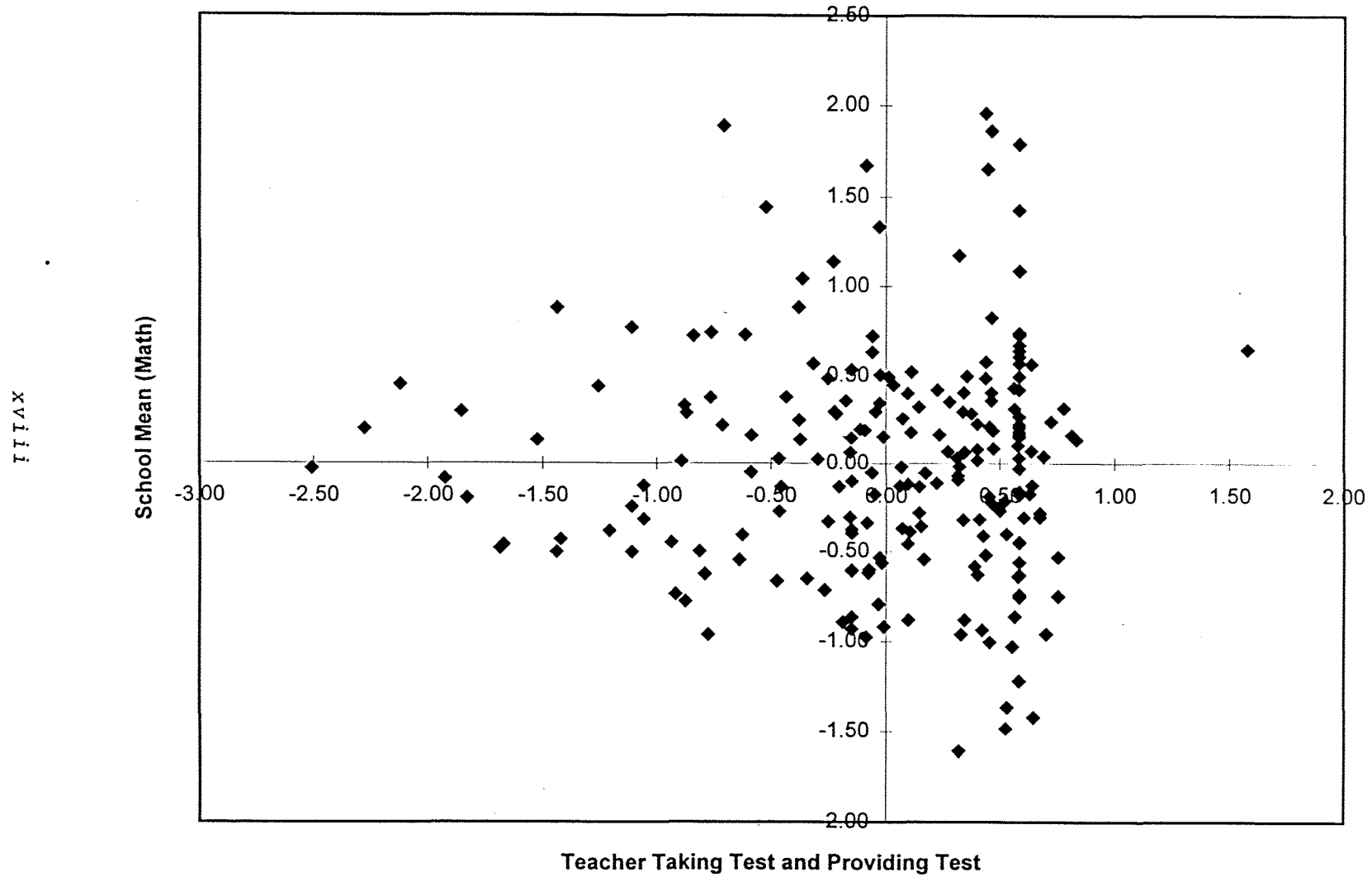
Adjusted school Mean in Mathematics Versus Teaching Experience



School Mathematics Mean Versus Teacher's Press in Math



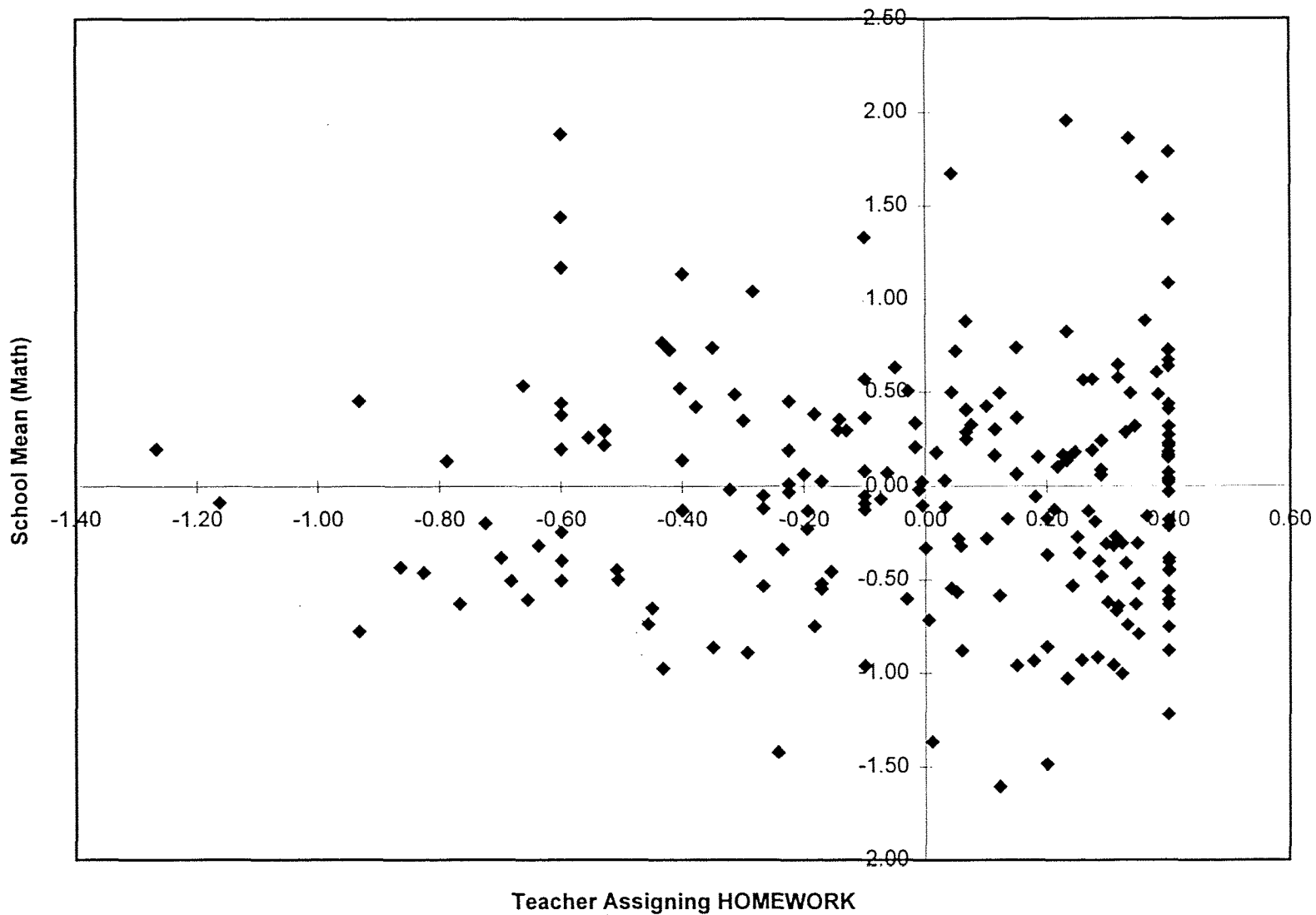
School Mathematics Mean Versus Teacher Taking Test and Providing Feedback



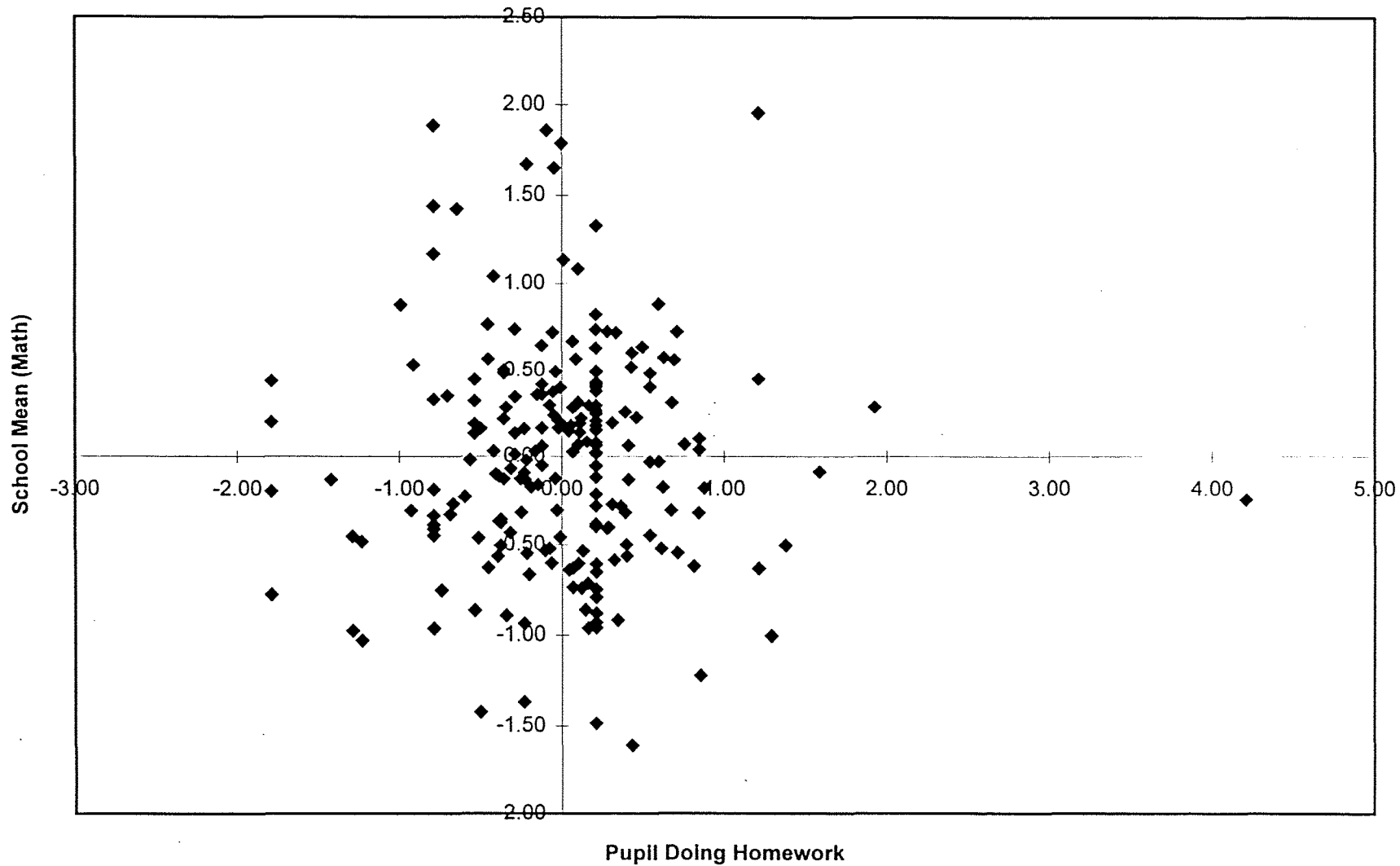


School Mathematics Mean Versus Teacher Assigning Homework

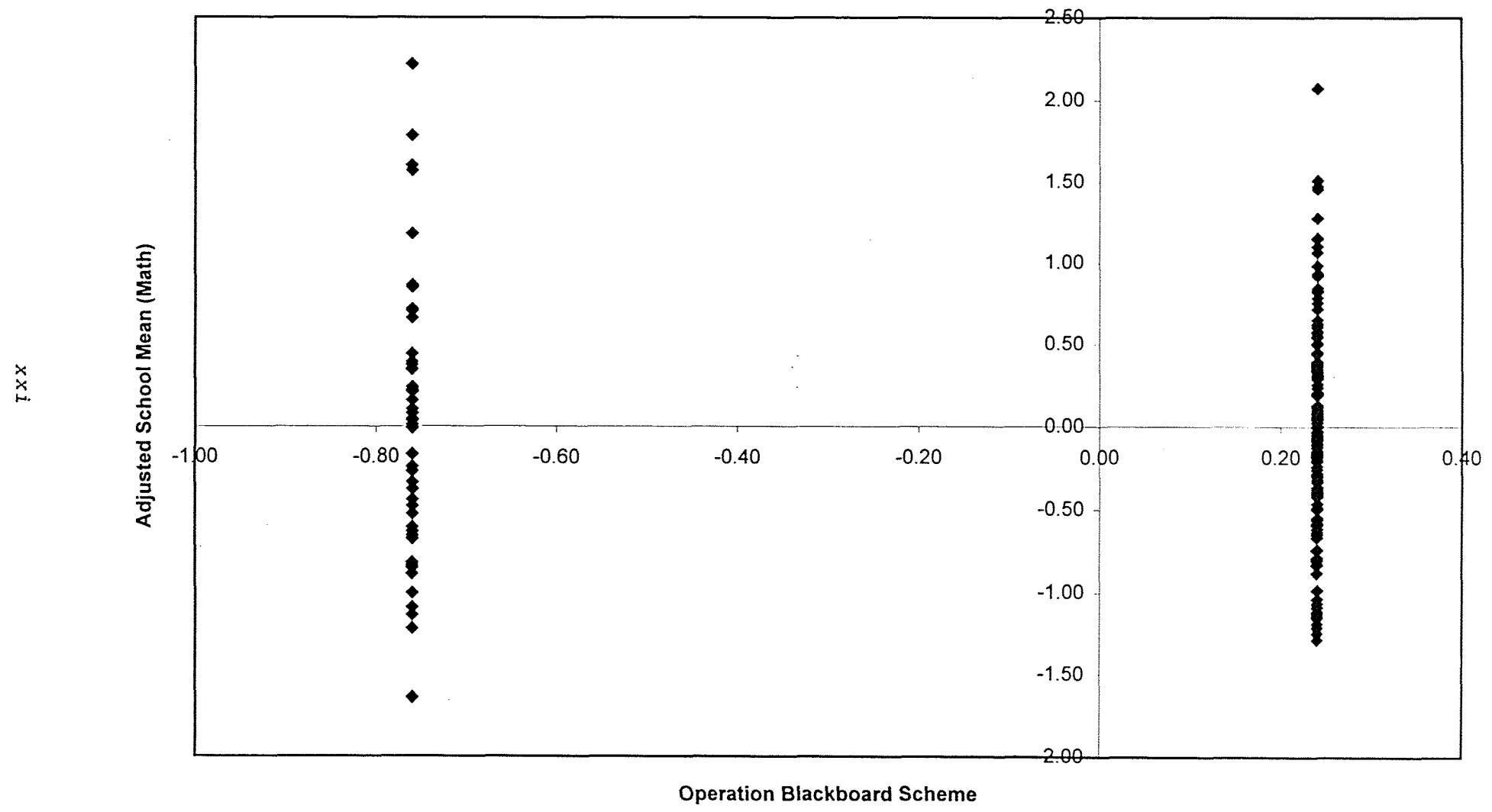
xix



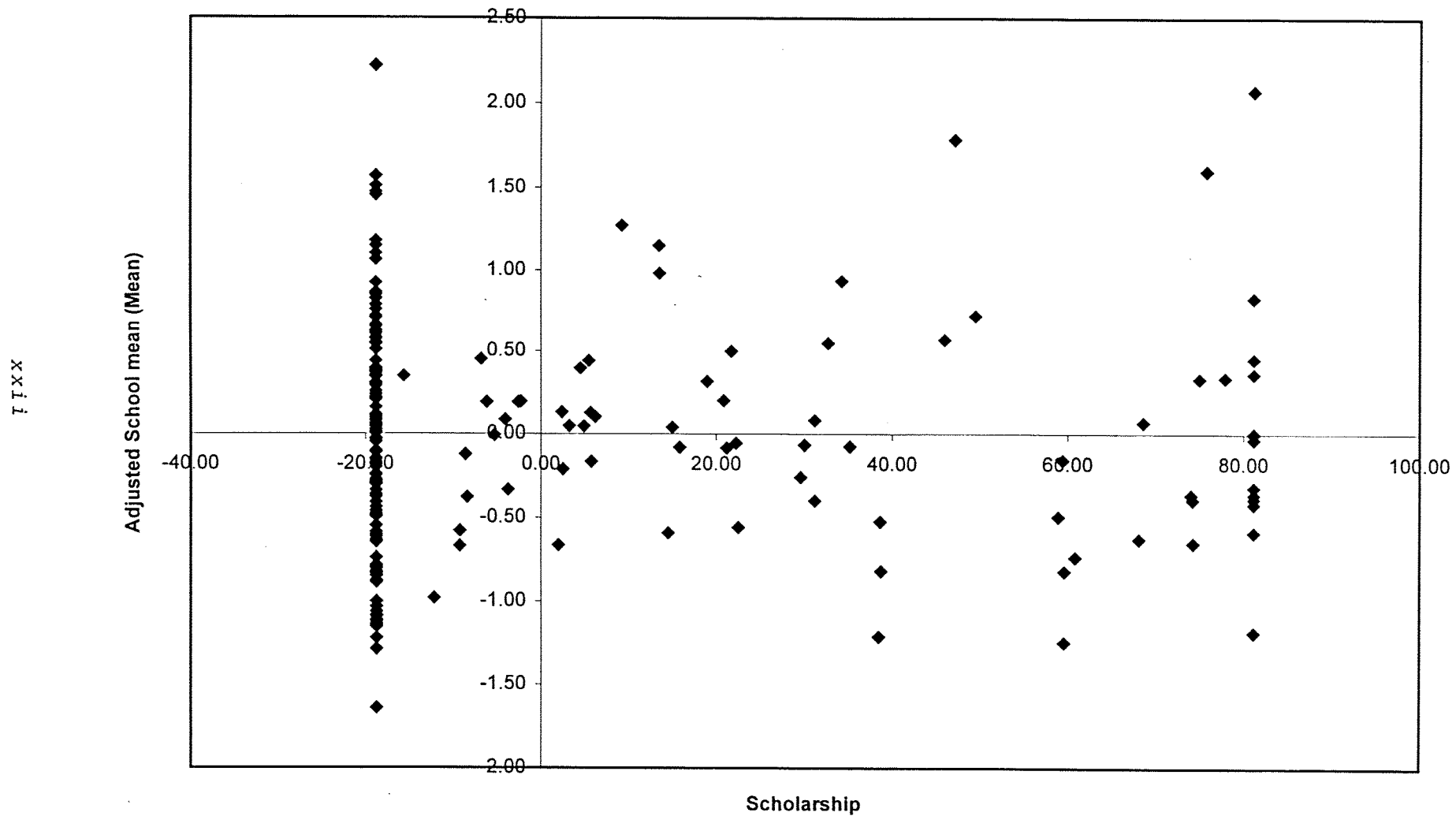
School Mathematics Mean Versus Pupil Doing Homework



Adjusted School Mathematics Mean Versus Operation Blackboard Scheme



Adjusted School Mathematics Mean Versus Scholarship



Significant Correlation Coefficients Between Achievement Scores and Other  
Student and School Variables

Student /School Variable	Mathematics	Language
SCST	- 0.0800 **	-----
DADED	0.0647 **	-----
MUMED	0.0781 **	-----
REPEAT	-----	=0.0693 **
SES	0.0813 **	0.0452 *
PCTFEMT	0.1386 *	-----
PRESSMTH	0.2282 **	0.2345 **
PRESSTST	0.3310 **	0.3341 **
PRESSTHW	0.2770 *	0.3212 **
PRESSLNG	-----	0.2939 **
COMMIT	0.2079 *	0.2181 *
PTRATIO	=0.2424 **	-----
MATERIALS	0.1974 *	-----
NUMTCH	-----	0.1774 *

- Significant at 1 %
- Significant at 0.1 %