CHAPTER – IV

METHODOLOGY

The purpose of the present study was to explore the nature of relationships of intelligence, parenting styles (viz., authoritative, authoritarian and permissive), classroom environment dimensions (viz., student cohesiveness, teacher support, task orientation, involvement, investigation, cooperation and equity) and autonomous / controlled regulations with academic achievement among Iranian and Indian students. Further, it also attempts to examine the role of intelligence, parenting styles and classroom environment variables on Iranian and Indian adolescents’ academic achievement as mediated by academic self-regulation. The present cross-cultural study of Iranian and Indian adolescents has been conducted using internationally accepted instruments.

The empirical verification of the proposed hypotheses, however, depends upon:
1. Selection of adequate sample;
2. Tools used for collecting data; and
3. Method and procedure employed for deriving conclusions for different measures.

Thus, it seems appropriate to describe the sample, the tools used and the method and procedure employed in completing the research being reported. In brief this chapter includes a description of:

4.1 Sample
4.2 Tests used
4.3 Administration of tests
4.4 Scoring of tests
4.5 Statistical analysis

4.1 Sample

Since the problem under the study is cross-cultural, two samples of students were drawn, one from Iran and the other one from India. The sample from Iran was randomly drawn from various governmental secondary schools of Tehran, Iran. The sample from India was randomly drawn from various governmental secondary schools of Chandigarh, India. The samples consisted of 800 adolescents from two nations: 400 from Iran (200 girls, 200 boys) and 400 from India (200 girls, 200 boys). Iranian girl subjects ranged in
age from 13 to 17 years, with a mean age of 14.9 and boy subjects from 13 to 17 years with a mean age of 15.1. Indian girl subjects ranged in age from 12 to 16 years, with a mean age of 14.1 and boy subjects from 12 to 16 years with a mean age of 14.2. Subjects came from middle-class backgrounds and from two-parent families in both countries. All the participants were living with their parents. The description of the subjects in the context of two parameters, namely sex and place of residence is given below:

<table>
<thead>
<tr>
<th>Subjects</th>
<th>India (N= 400)</th>
<th>Iran (N= 400)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males (N=200)</td>
<td>Males (N=200)</td>
</tr>
<tr>
<td></td>
<td>Females (N=200)</td>
<td>Females (N=200)</td>
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</tbody>
</table>

4.2 Tests used

The tools used in this study can be grouped into 4 tools: Parental Authority Questionnaire (PAQ), What Is Happening In this Class Questionnaire (WIHIC), Academic Self-regulation Questionnaire and Standard Progressive Matrices (Raven). Intelligence score (Raven) of the Iranian high school students is available in educational file of students in counseling center in each high school. Therefore, for Iranian sample intelligence score was collected from their files. The time required to complete the questionnaires was about three hours for Indian sample, whereas it was about two hours for Iranian sample. The respondents were guaranteed anonymity of their responses. Some tools were standardized in Iran and India and some of them were used for the first time.

These tools were tested and adapted in a pilot study before they were used in the main study. From current and prior studies, the reliability of all the instruments has been documented separately for the two samples drawn from India and Iran.

4.2.1 Parental Authority Questionnaire

The Parental Authority Questionnaire consists of 30 statements about each parent, which are on a Likert 5 points scale. Ten statements describe permissive parents, ten authoritarian, and ten authoritative (Buri, 1991). Buri (1991) developed this questionnaire for the purpose of measuring Baumrind’s (1971) permissive, authoritarian, and
authoritative parental authority prototypes. Twenty-one professionals working in the
fields of psychology, education, sociology, and social work have checked content
validity. This questionnaire showed discriminant-related validity and criterion-related
validity, and the test-retest reliability estimates were $r = .78$ for mother’s
authoritativeness, $r = .86$ for mother’s authoritarianism, $r = .81$ for mother’s
permissiveness, and $r = .92$ for father’s authoritativeness, $r = .85$ for father’s
authoritarianism, $r = .77$ for father’s permissiveness. It was used in several countries
and cross-cultural researches (Weiss & Schwarz, 1996; Chen et al., 1997).

In this study, PAQ was translated into the Persian language in Iran (Appendices G
and H). Then 10 professionals working in the fields of psychology and education checked
the content validity of translated questionnaire and the suggestions offered were
incorporated in the final form. For the purpose of establishing reliability in present study,
the investigator administered the questionnaire on 220 secondary school students (female
= 110, male = 110) who were taken from the main sample. The estimated Cronbach’s
alpha reliability coefficients for Iranian sample were .76 for mother’s authoritativeness,
.74 for mother’s authoritarianism, .69 for mother’s permissiveness, and .74 for father’s
authoritativeness, .75 for father’s authoritarianism, .72 for father’s permissiveness.

In India, 6 professionals working in the field of psychology were presented the 30
questionnaire items. Each of these professionals was also given description of the
permissive, authoritarian, and authoritative styles and was asked to judge each item
according to its accuracy in characterizing each of the styles. Agreement among 6
professionals suggests that the content validity of this questionnaire is good and a few
changes have been considered in the original questionnaire (Appendices C and D). For
the purpose of establishing reliability in the present study, the investigator administered
the questionnaire on 220 secondary school students (female = 110, male = 110). The
Cronbach’s alpha reliability coefficients were .74 for mother’s authoritativeness, .72 for
mother’s authoritarianism, .75 for mother’s permissiveness, and .72 for father’s
authoritativeness, .76 for father’s authoritarianism, .75 for father’s permissiveness for
Indian sample.
4.2.2 What Is Happening In This Class Questionnaire

WIHIC developed by Fraser, Fisher and McRobbie (1996) contains 7 scales and 56 items, which can be used to measure the psychosocial aspects of the classroom learning environment in various contexts since its development. This scale is composed of the following seven components: 1) Involvement 2) Student cohesiveness 3) Teacher support 4) Task orientation 5) Investigation 6) Cooperation 7) Equity.

The reliability coefficients for different scales ranged from .78 to .87 when using the individual student as the unit of analysis and from .81 to .94 when using the class mean as the unit of statistical analysis. This scale has adequate discrimination validity. It was used in Australia, Singapore, and Korea (Aldridge et al., 1999; Kim, Fisher, & Fraser, 2000).

It is standardized in India (Appendix B). The alpha reliability coefficients were .58 for student cohesiveness, .78 for teacher support, .76 for involvement, .70 for task orientation, .77 for investigation, .77 for cooperation, and .83 for equity when using the individual student as the unit of analysis. Also, discrimination validity was ranging from .38 to .47 in different subscales (Koul & Fisher, 2002).

In Iran, in present study, What Is Happening In This Class Questionnaire was translated into the Persian language (Appendix F). Then 12 professionals working in the field of psychology and education checked the content validity of translated questionnaire and the suggestions offered were incorporated in the final form. For the purpose of establishing reliability in present context, the investigator administered the questionnaire on 220 secondary school students (female = 110, male = 110) who were taken from the main sample. The estimated Cronbach’s alpha reliability coefficients for Iranian sample were .68 for student cohesiveness, .73 for teacher support, .71 for involvement, .76 for task orientation, .75 for investigation, .72 for cooperation, and .77 for equity when using the individual student as the unit of analysis.

4.2.3 Academic Self-Regulation Questionnaire

This questionnaire concerns the reasons why children do their schoolwork. The academic self-regulation questionnaire uses four subscales: external regulation, introjected regulation, identified regulation, and internal regulation. Internal consistency
estimates for each reason category range from .62 to .82, indicating moderate to high levels of internal consistency (Ryan & Connell, 1989). Ryan and Connell (1989) indicated that this questionnaire has significant correlation with Harter’s (1981) and DeCharms’ (1976) measures.

Reliability was examined in India by Trama (1998). The alpha reliabilities of the four subscales, viz., external, introjected, identified and internal were found to be .73, .79, .74, and .68 respectively for secondary school children (Appendix E). This questionnaire is divided into two subscales: autonomous regulation and controlled regulation. In these scales, items representing identified and internal regulation make up the autonomous subscale, and items representing external and introjected regulation make up the controlled regulation subscale.

Academic self-regulation questionnaire was translated into the Persian language in Iran. Then, 12 professionals working in the fields of psychology and education checked the content validity of translated questionnaire and the suggestions offered were incorporated in the final form (Appendix I). For the purpose of establishing reliability in present context, the investigator administered the questionnaire on 220 secondary school students (female = 110, male = 110) who were taken from the main sample. The alpha reliabilities of the four subscales, viz., external, introjected, identified and internal were found to be .71, .68, .64, and .67 respectively for secondary school students in Iran.

4.2.4 Academic achievement

The evaluation systems of academic achievement in both the countries are not same, i.e. the range of scores in Iran is between 0-20 and in India is between 0-100 marks. In the present study, academic achievement is measured by taking the percentage of the aggregate of total marks attained by the student in all the subjects at the last year’s final examination.

4.2.5 Standard Progressive Matrices (Raven, 1958)

It is used as a non-verbal test of intellectual efficiency. A person is required to perceive relation between figures and use a logical method of reasoning. It consists of five sets (A, B, C, D, and E) of twelve problems each, thus comprising of a total of sixty
problems. In each set, the first problem is as nearly as possible self-evident. The problems, which follow, become more and more difficult to solve. The test can be administered, as an individual or group test, and it can also be self-administered. An individual’s total score on all the sixty problems is indicative of her/his mental ability. It is culture-free, and its reliability and validity are well-established. It has been used in Iran and India extensively. The time limit for the test is 40 minutes.

4.3 Administration of tests

The data were collected in three steps. In the first step the students to be included in the sample were selected. In the second step the students were actually contacted for filling up the questionnaire. They were told that honest replies by them would surely help the researcher to get better information. Necessary guidance and instructions were given to them. Each form was checked to see if any omission was there and if so, the particular subject was asked to complete that question or questions (except for intelligent test where it was requested strictly that students do not discuss or take help from one another to finish the test in specified time).

Strict supervision was exercised in order to see that the subjects do not take help from each other while performing on the other tests. Subjects were told that information was being collected purely for research purpose. They were also assured that the information to be collected would remain strictly confidential and presented only in a form in which no person could be identified. The general testing conditions were satisfactory.

In the last step, investigator again went to different schools and collected the academic achievement scores from the result sheet of the concerned schools. The final data was 400 from Iran and 400 from India.

4.4 Scoring of tests

Parental Authority Questionnaire completed by students show their parents’ parenting styles. Responses to each of the items are made on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Therefore, this questionnaire yields six separate scores for each participant: mother’s permissiveness, mother’s
authoritarianism, mother’s authoritativeness, father’s permissiveness, father’s authoritarianism, and father’s authoritativeness. Scores on each of these variables can range from 10 to 50; the higher the score the greater the appraised level of the parental authority prototype measured.

What Is Happening In This Class Questionnaire comprises of 56 items (8 items in each of the seven scales). Items are scored 1, 2, 3, 4, and 5, respectively, for the responses (almost never, seldom, sometimes, often, and almost always). Scores on each of the seven scales can range from 8 to 40.

Academic Self-regulation Questionnaire has four subscales: external, introjected, identified, and intrinsic. The subscale scores on the academic self-regulation, regardless of the number of subscales in the scale, can be combined into two super categories of regulation: autonomous regulation and controlled regulation. Autonomous regulation includes averaging across identified and intrinsic items, and controlled regulation includes averaging across external and introjected items. Therefore, the investigator calculates the subscales by averaging the items that make up that subscale. Very true is scored 4; sort of true is scored 3; not very true is scored 2; not at all true is scored 1.

Standard Progressive Matrices consists of sixty items to assess the intelligence level of secondary school students. An individual’s total score on all the sixty problems is indicative of her/his mental ability.

4.5 Statistical analysis

In accordance with the nature of data and complexity of the study, to test the various hypotheses based on the objectives of the study, different statistical techniques were needed. The techniques used in the study are mentioned below:

1. Descriptive statistics like mean and standard deviation were computed to study the nature and distribution of variables.

2. t-ratios were used to compare two cultures and sexes on different variables, viz., parenting styles (maternal/paternal authoritativeness, authoritarianism, and permissiveness), classroom environment dimensions (student cohesiveness, teacher support, task orientation, involvement, investigation, cooperation, and equity) and academic self-regulation (autonomous and controlled regulation).
3. Pearson’s coefficient of correlation was used to study the inter-correlation among all variables (i.e., intelligence, parenting styles, classroom environment dimensions, academic self-regulation and academic achievement).

4. A series of path analyses were performed, and beta weights (β’s) from multiple hierarchical regression analysis were used. The three-step procedure for examining mediation proposed by Judd and Kenny (1981) was followed in this study.

Wright (1934) introduced Path analysis for the first time. This method is not a method for discovering causes. It is a method applied to a causal model formulated by the researcher on the basis of previous researches, theory and knowledge. Path analysis explains the workability of the hypothesized model and not to confirm or disconfirm it. It is assumed that if a causal relationship does exist amongst the variables, the cause is in the direction of the arrow rather than the reverse.

Covington and Omelich (1979, pp. 1488) stated that “path analysis allow for all determining factors as specified by a causal model to be incorporated into an overall predictive analysis, thereby permitting an estimation of the relative contribution (both direct and indirect) of each determinant to variations in the dependent variable(s)”.

However, “it is important to bear in mind that path analysis is not a produce for demonstrating causality. Rather it is a method for tracing out the implications of a set of causal assumptions that the theoretician is willing to impose on a system of relationship” (Covington & Omelich, 1979, pp. 1489).

In other words, arrows in such models indicate a weak causal ordering and not direct causal relationship. In this causal analysis, there is a distinction between exogenous and endogenous variable. Exogenous variable is a variable that is not caused by another variable in the model. Usually this variable causes one or more variables in the model. Of course, no attempt is made to explain the variability of an exogenous variable or its relations with other exogenous variables. In the present study, intelligence, parenting styles and classroom environment dimensions were the exogenous variables. However, endogenous variable is a variable that is caused by one or more variables in the model. An endogenous variable may also cause another endogenous variable in the model. In the present study, the endogenous variables were academic self-regulation and academic
Path coefficients were estimated by beta weight ($\beta$) from standard multiple regression analysis (Kenny, 1979). The relationships between the independent, mediator and dependent variables have been given in the figure I (p. 61).

For testing mediation, Judd and Kenny (1981) recommended that a series of regression models should be estimated. However, the use of multiple regression to estimate a mediation of model requires the following assumption: first, there should be no measurement error in the mediator, second, dependent variable should not cause the mediator.

The mediator, because is often an internal variable, is likely to be measured with error. The presence of measurement error in the mediator tends to produce and underestimate of the effect of the mediator and an overestimate of the effect of the independent variable on the dependent variable. The overestimation of the effects of the independent variable on the dependent variable is enhanced to the extent that the independent variable causes the mediator and the mediator causes the dependent variable. Because a successful mediator is caused by the independent variable and causes the dependent variable, successful mediators measured with error are most subject to this overestimation bias (Baron & Kenny, 1986).

“The common approach to unreliability is to have multiple operations or indicators of the construct. Such an approach requires two or more operationalizations or indicators of each construct” (Baron & Kenny, 1986, p. 1176). The major advantage of structural modeling techniques is the following: first, all the relevant paths are directly tested. Second, complications of measurement error, correlation measurement error, correlated measurement error, and even feedbacks are incorporated directly into the model (Judd & Kenny, 1981; Bentler, 1982; Baron & Kenny, 1986; Joreskog & Sorbom, 1996; Coffman & MacCallum, 2005; Kenny, 2006).

Therefore, on the basis of above reasons, basic research model divided into two separate models for avoiding overestimation and underestimation bias in different variables. They include parents' model and classrooms' model (Figures II-III). Since intelligence is a powerful cognitive variable, it is applied in both the models.
FIGURE II: PARENTS’ MODEL OF RELATIONS BETWEEN ACADEMIC ACHIEVEMENT, INTELLIGENCE, PARENTING STYLES AND ACADEMIC SELF-REGULATION (AUTONOMOUS AND CONTROLLED REGULATIONS)
FIGURE III: CLASSROOMS’ MODEL OF RELATIONS BETWEEN
ACADEMIC ACHIEVEMENT, INTELLIGENCE, CLASSROOM
ENVIRONMENT AND ACADEMIC SELF-REGULATION (AUTONOMOUS
AND CONTROLLED REGULATIONS)