Chapter Three

METHODOLOGY

Methodology is of a paramount importance in any scientific inquiry, as validity and the reliability of the facts primarily depend upon the system of investigation. The present investigation was explored to examine the impact of academic stress and hardiness on achievement motivation and problem solving behavior of adolescents. The description of the sample, the instruments used and statistical analysis of the data was done to achieve objectives of the present study.

3.1. Research Design

Factorial design is the most appropriate measure to examine the interaction among variables. According to Kerlinger (1973), “Factorial design is the structure of research in which two or more independent variables are analyzed in order to study their independent and interactive effects on a dependent variable.”

Research design mainly depends on research objectives and research questions. In order to answer the research questions set in chapter one, the present investigator has applied Analysis of Variance (three-way ANOVA) in which $2 \times 2 \times 2$ research design was chosen for data analysis.

3.2. Sample

In the present study, four hundred (400) students were selected on the basis of purposive random sampling. Sample was divided on the basis of science and social science streams. Out of 400 students, there were 200 students for science and social science stream respectively. Male and female subjects were included in the sample. There
were 100 boys and 100 girls of science stream, and 100 boys and 100 girls of social science stream. Students were selected from Senior Secondary School (Boys section) of Aligarh Muslim University and Aligarh Public School, Aligarh (U.P.) India. Subjects were further classified on the basis of scores obtained on the students stress scale and hardiness scale. Subjects who have obtained scores below 74 were categorized as low academic stress and subjects who scored more than 94 were categorized as highly academic stress. Similarly, subjects were categorized as high and low hardy on the basis of scores obtained on hardiness scale. Low hardy subjects score ranges from 84 to 98 and the high hardy subjects score ranges from 111 to 134. The age range of the subjects was from 15 to 17 years.

### 3.2.1. Break-up of subjects

#### Academic Stress

![](3.2.1.1 Academic Stress.png)

[Fig. 3.2.1.1 Academic Stress]
3.3. Tools

In the present study, four scales, namely, Student Stress Scale, Hardiness Scale, Achievement Motivation Scale and Problem Solving Ability Test were used.

3.3.1. Development of Student Stress Scale (SSS)

This scale was developed by Husain, Rashid and Jahan (2001). The SSS comprised 57 items which measure sources of academic stress among students. There are four alternative response categories ranging from ‘No Stress at all’ to ‘Extreme Stress’ and the scores range from 0 to 3. The principal component analysis of SSS was done by the present investigator. In the sample, the eigen values of the first 10 factors derived from the 57 items were: 8.4176, 3.7222, 3.67844, 3.65553, 3.62776, 3.56965, 3.42452,
When the investigator rotated the factors to a varimax solution, every item had its primary loading on the factor defined by the other items of its scale and all primary loadings exceeded .40. Factor analyses of the 57 items produced a five-factor structure. Finally 36 items were selected which represent the five factors. Each factor consists of five or more items. The number of items representing the 5 factors are as: (I) Inadequate academic environment in the college (item nos. 1, 5, 12, 21, 30, 34, 43, 51, 57), (II) Lack of adjustment (item nos. 9, 11, 14, 16, 24, 26, 39, 52), (III) Apprehensive about future (item nos. 2, 15, 18, 19, 22, 28, 46), (IV) Poor administration (item nos. 3, 4, 7, 10, 17, 29) and (V) Worries (item nos. 25, 37, 41, 47, 49, 50).

The resulting five factors’ scores were intercorrelated with each other in the student sample. Cronbach’s Alpha of SSS of present sample was found to be .829.

3.3.2. Hardiness Scale (HS)

The short version of Hardiness Scale (HS) developed by Kobasa and Maddi (1982) was used to measure the level of hardiness of students. The scale comprised 36 items and it measure three components (i.e. Commitment, Control and Challenge). The responses of the subjects on hardiness scale were obtained on four-point scale ranging from ‘Not at all’ to ‘Completely true.’ The response categories were assigned scores of 1, 2, 3 and 4 respectively.

The short form of control scale included in the questionnaire contains both 4-points and 2-points response items. The simple summation of these items result in the overweighing of the 4-point item. Therefore, to avoid the confusion of the responses to items of the control scale were coded to have the same range as items from the other scales. That is, the subject either received ‘1’ or ‘4’ for their responses to this scale.
thereafter; the raw scores on the subscales were converted into Z scores. The items on the scale are negatively keyed. Subjects whose scores fell below Q1 were identified as low hardy and subjects whose scores fall above Q3 were categorized as high hardy.

3.3.3. Achievement Motivation Scale (AMS)

Achievement Motivation Scale was constructed and standardized by Shah (1986). The AMS based on forced-choice contains 40 items distributed over four dimensions i.e. as (a) Need for Academic Success (item nos.2,3,11,14,18,21,26,31,37,40), (b) Need for Vocational Achievement (item nos. 1,5,9,13,16,17,19,20,33,36), (c) Need for Social Achievement (item nos.4,7,12,15,22,23,27,34,38,39) and (d) Need for Skill Achievement (item nos. 6,8,10,24,25,28,29,30,32,35). Each statement is followed by three alternative responses. The alternatives are arranged in order to one’s inclination towards achievements in the areas of academic, vocation, social context and skills. Weightage 1, 2 and 3 are respectively were awarded for alternatives (a), (b) & (c) respectively on each statement.

3.3.4. Problem Solving Ability Test (PSAT)

Problem Solving Ability Test (PSAT) was constructed and standardized by Garg (1982). This test has been prescribed to assess the level of intelligence of the students. Items have been selected after carefully examination of available test of problem solving inventories, rating test and intelligence test etc. including mathematical puzzles, problems concerned with general knowledge and series tests. This test consisted of 22 problems along with alternative answer, (except item No.2 and 20) in which only one answer is correct. Subject who writes the correct answer he/she was awarded one mark and for the
wrong answer zero was given and the maximum marks obtained by the subject was 22 on
the PSAT.

3.4. Personal Data Sheet

Personal data sheet includes information related to name, age, gender, class and
streams of the subjects as detailed in Appendices, (Appendix-E).

3.5. Procedure

First of all, the investigator obtained permission from the Principals of three
senior secondary schools of Aligarh Muslim University, Aligarh (U.P) India. The senior
secondary school (Boys section), senior secondary school (Girls section) of Aligarh
Muslim University and Aligarh Public school (Senior Secondary) Aligarh for the data
collection. The investigator established rapport with the students and requested them to
participate voluntarily and cooperate in the data collection process. The purpose of the
data collection was explained to the students of said schools and assured that their
responses would be kept strictly confidential and would be utilized for the research
purpose only. The data was collected in small groups ranging from 10 to 20 students in
the classrooms.

All four questionnaires were given to the students and sufficient time was given
them to complete the questionnaires. It was not possible to administer all four scales on
students in one sitting. The data was collected in two sessions.

3.6. Data Analysis

The data was analyzed by Statistical Packages for Social Sciences (SPSS, 16.0
versions). Analysis of Variance (Three Way ANOVA) was applied to analyze the data in
order to examine the effects of academic stress and hardiness on achievement motivation and problem solving behavior of adolescents.

Data was analyzed: (1) to examine the effects of levels of academic stress (low and high), stream (science and social science) and gender (boys and girls) and the interaction between them on the overall scorers of achievement motivation, (2) to examine the main effects of levels of academic stress (low and high), stream (science and social science) and gender (boys and girls) and the interaction between them on the overall scorers of problem solving, (3) to examine the main effects of levels of hardiness (low and high), stream (science and social science) and gender (boys and girls) and the interaction between them on the overall scorers of achievement motivation and (4) to examine the main effects of levels of hardiness (low and high), stream (science and social science) and gender (boys and girls) and the interaction between them on the overall scorers of problem solving.

Reliability and validity of academic stress scale were determined by using Cronbach’s Alpha and factorial validity.