CHAPTER III
STUDY II

RELIABILITY AND VALIDITY OF THE ADJUSTMENT PROJECTIVE-INVENTORY
INTRODUCTION

Following the projective-inventory approach, an Adjustment Inventory was developed in the first study for measuring the areas of adjustment such as health, home, social, and emotional. It was then necessary to check if we measure the same set of attributes in repeated occasions with the same adjustment projective-inventory, shall we get the same or similar results? In other words, are the scores obtained from the Adjustment Projective-Inventory the "true" measures of the attributes under measurement? These two questions are related to the reliability of Adjustment Projective-Inventory. In same way, it was also necessary to check what the Adjustment Projective Inventory measures and how well it does so. These two questions relate to the fundamental issues of validity. If a test is found to be valid because it predicts some practical criterion and if we add to it more of the same kind of true variance making it more reliable, we also add to its validity. As stated in the foregoing sections, both reliability and validity are most important psychometric characteristics of a psychological test. If one does not know the reliability and validity of a measuring instrument, little faith can be put in the results obtained and the conclusions drawn there from. Thus they may constitute a major threat to validity. Concern for
reliability comes from the necessity for dependability in measurement. It is also important to note here that the test of adjustment, which was developed in Study I following the projective-inventory method cannot be recommended for future use before determining its reliability and validity. A review of literature on projective-inventory (Banu, 1981; Patnaik, 1985; Puhan & Ray, 1985; Samal, 1983) also suggests that further investigation should be made for determining the reliability and validity of these measures carefully. Therefore, study II was conducted to determine reliability and validity of this newly developed Adjustment Projective-Inventory.

Reliability

Synonyms for reliability are dependability, stability, consistency, predictability, and accuracy (Kerlinger, 1964). Reliability of a test traditionally refers to the consistency of its scores when it is administered on different occasions to the same group of individuals as in test-retest. reliability, it may also refer to the consistency of scores across items sampled when equivalent forms of a test are administered to a single group of individuals at a point in time as is done in equivalent form of reliability. Finally, reliability may also refer to the consistency of scores obtained by different items
There are four fundamental types of approaches to the estimation of reliability. All of these are designed to answer the question, "what is the self-correlation of this test?" There have been four standard procedures, known as the retest, alternate-forms, split-half, and Kuder-Richardson methods. All have in common the goal of deriving two sets of scores from the "same" test administered to the "same" sample for the purpose of correlation to find out a reliability coefficient (Guilford, 1975; Kerlinger, 1964; Nunnally, 1970).

Test-Retest Reliability. The most obvious method for finding the reliability of test scores is by repeating the identical test on a second occasion. The reliability coefficient in this case is simply the correlations between the scores obtained by the same persons on the two administrations of the test. The key concept of this procedure is that of stability. It answers the question concerning how stable or dependable are the measurements over a period of time. High reliability of this kind tells us that the individuals remain rather uniform, or maintain the rank positions in spite of changes in whatever psychological functions this test measures.
Alternate-Form Reliability. In alternate-form reliability, the same persons can thus be tested with one form on the first occasion and subsequently with another comparable form on the second occasion. The correlations between the scores obtained on the two forms represents the reliability coefficient of the test. It will be noted that such a reliability coefficient is a measure of both temporal stability and consistency of response to different item samples (or test forms). In the development of alternate forms, care should of course be exercised to ensure that they are truly parallel. Parallel tests have equal means, equal variances, and equal intercorrelations with one another (Gulliksen, 1950). However, alternate forms or parallel tests are unavailable for many tests because of the practical difficulties of constructing comparable forms. For all these reasons, other techniques for estimating test reliability are often required. These types of difficulties were also found for Adjustment Projective-Inventory because it was very difficult to construct parallel forms which may have equal means, equal variances, and equal intercorrelations with one another.

Split-Half Reliability. From a single administration of one form of a test, it is possible to arrive at a measure of reliability by various split-half procedures.
In this method, two scores are obtained for each person by dividing the test into comparable halves. It is apparent that split-half reliability provides a measure of consistency with regard to content sampling. This type of reliability coefficient is sometimes called a coefficient of internal consistency since only a single administration of a single form is required. To find out split-half reliability, the first problem is how to split the test in order to obtain the most nearly comparable halves. A test can be divided in many different ways. A widely practiced method is to find out the scores on the odd and even items of the test. If the items were originally arranged in order of difficulty, such a division yields very nearly equivalent halves. There is a general agreement that split-half methods of estimating reliability should be applied to power tests only, or to tests that approach the pure power condition.

**Kuder-Richardson Reliability.** A fourth method for finding reliability which utilizes a single administration of a single form, is based on the consistency of responses to all items in the test. The most common procedure for finding out inter-item consistency is developed by Kuder and Richardson (1937). As in the split-half methods, inter-item consistency is found from a single administration of a single test rather than requiring two half-scores.
and is based on an examination of performance on each item. It can be shown mathematically that the Kuder-Richardson reliability coefficient is actually the mean of all split-half coefficients resulting from all possible splitting of a test (Cronbach, 1951). The Kuder-Richardson formula is applicable to tests whose items are scored as right or wrong. Thus, this kind of reliability would be appropriate for Adjustment Projective-Inventory.

Above discussion indicates that for the present Adjustment Projective-Inventory, an alternate form of reliability would be difficult. The stories and statements of this scale reflect differential manifestations of the trait under measurement, so it would be impossible to divide the test items into equal parts. Therefore, reliability of the projective-inventory measures cannot be examined by split-half method. In this case, perhaps test-retest and Kuder-Richardson reliability would be more appropriate methods for reliability testing. Therefore, an attempt was made in the study II to estimate the test-retest and Kuder-Richardson reliability of the Adjustment Projective-Inventory for each areas separately.

Validity

It may be pointed out that reliability as such may not be enough justification of a personality measure and the approach it follows. Validity, on the other hand,
ensures some amount of reliability and is a far more important consideration than reliability. However, both the requirements are essential and need to be ensured in any personality measures. The validity of a test concerns what the test measures and how well it does so. It tells us what can be inferred from test scores and examines the extent to which a test measures what it intends or purports to measure (Gullikson, 1950; Kline, 1979; Loevinger, 1957; Nunnally, 1970). Fundamentally, all procedures for determining test validity are concerned with the relationships between performance on the test and other independently observable facts about the behaviour characteristics under consideration. The specific methods employed for investigating these relationships are numerous and have been described by various names. These procedures are classified under three principal categories such as content, criterion-related, and construct validity.

**Content-Validity.** Content validation involves essentially the systematic examination of the text content to determine whether it covers a representative sample of the behaviour domain to be measured (Anastasi, 1982). Such a validation procedure is commonly used in evaluating achievement tests. This type of test is designed to measure how well the individual has mastered a specific skill or course of study. Content validation is also
applicable to certain occupational tests used for employee selection and classification. For aptitude and personality tests, on the other hand, content validation is usually inappropriate and may, in fact, be misleading. Content validity should not be confused with face validity. The latter is not validity in the technical sense; it refers, not to what the test actually measures, but to what it appears superficially to measure (Anastasi, 1982).

Criterion-Related Validity. Criterion-related validation procedures indicate the effectiveness of a test in predicting an individual's behaviour in specific situations. For this purpose, performance on the test is checked against a criterion i.e., direct and independent measures of that which the test is designed to predict. Because the test is used to predict the criterion, this kind of validity is sometimes referred to as predictive validity. Some writers refer to it as empirical validity (Brown, 1970). The information provided by predictive validation is most relevant to tests used in the selection and classification of personnel. In a number of instances, concurrent validation is employed merely as a substitute for predictive validation. It is frequently impracticable to extend validation procedures over the time required for predictive validation. Concurrent validation is
relevant to tests employed for diagnosis of existing status rather than prediction of future outcomes.

In criterion-related validity, the selection of appropriate criterion measure for newly developed test is often difficult. For this reason, Anastasi (1982) has reported some appropriate criteria for certain types of tests. For example, in the development of certain personality tests, psychiatric diagnosis may be used both as a basis for the selection of items and as evidence of test validity and ratings have been employed in the validation of almost every type of test. They are particularly useful in providing criteria for personality tests as objective criteria are much more difficult to find out in this area. Correlations between a new test and previously available tests are also frequently cited as evidence of validity.

**Construct Validity.** The construct validity of a test refers to the extent to which the test may be said to measure a theoretical construct or trait. Examples of such constructs are intelligence, mechanical comprehension, verbal fluency, and anxiety (Cronbach & Meehl, 1955). In a thoughtful analysis of construct validations, Campbell (1960) pointed out that in order to demonstrate construct validity, we must show not only that a test correlates significantly with other variables with which it should
theoretically correlate, but also that it does not correlate significantly with variables from which it should differ. In another article, Campbell and Fiske (1959) described the former process as convergent validation and the latter as discriminant validation. Discriminant validation is also especially relevant to the validation of personality tests in which irrelevant variables may affect scores in a variety of ways. Campbell and Fiske (1959) proposed a systematic experimental design for this dual approach of convergent and discriminant validation which they called the "multitrait-multimethod matrix". Essentially, this procedure requires the assessment of two or more traits by two or more methods. Messick (1980) has argued convincingly that the term validity, in so far as it designates the interpretive meaningfulness of a test should be reserved for construct validity.

Reliability and validity both are basic requirements of psychological tests. These concepts and their types and methods were also described in detail in the preceding sections. It was also obvious from earlier analyses that test-retest and Kuder-Richardson reliability would be more appropriate for the newly developed Adjustment Projective-Inventory. As stated earlier, Adjustment Projective-Inventory provides separate measures of health, home,
social, and emotional adjustments. Thus, test-retest and Kuder-Richardson reliability were computed for each mentioned areas of adjustment and for the total scale. An attempt was also made in the present study (Study II) to determine the validity of the Adjustment Projective-Inventory. The validity is quite a broad term and many authors (i.e., Anastasi, 1982; Ghiselli, 1964; Guildford, 1975; Kerlinger, 1964) have suggested that types of validity would very much depend on the purpose for which the test is developed.

As stated earlier, criterion-related and construct validity (convergent and discriminant validity) would be more appropriate for personality tests. Since construct validity would require accumulated data on different theoretical fronts, and since a test development was not the basic consideration of the present study, no step was taken to establish this validity. The study II, therefore, attempted to evaluate only test-retest and Kuder-Richardson reliability and criterion validity of the Adjustment Projective-Inventory.

METHOD

Subjects

A total of 200 graduate students selected randomly from the D.A.V. Degree College, Gorakhpur, in the State of
U. P., served as the subjects for the present study. The other details of the subjects are given in Table 13.

Table 13
Description of the Subjects.

<table>
<thead>
<tr>
<th>Subject</th>
<th>N</th>
<th>Age Range in years</th>
<th>Average Age in years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30</td>
<td>18-21</td>
<td>20.5</td>
</tr>
<tr>
<td>Female</td>
<td>120</td>
<td>17-20</td>
<td>18.5</td>
</tr>
</tbody>
</table>

Description of the Testing Techniques and Instruments

Reliability and validity were computed for newly developed Adjustment Projective-Inventory in this study. In fact, for computing the reliability, this scale was given twice to the subjects with an interval of one month. For criterion-related validity, Adjustment Inventory (Asthana, 1950) and ratings by respective parents and friends were used as criterion measures. The details descriptions about these psychological instruments used in the study II are given below.

Adjustment Projective-Inventory. This projective-inventory which was developed in study I contains eight stories and 97 items (statements) for measuring the health,
home, social and emotional adjustments. Two stories were recommended for each area with 21, 29, 23, and 24 items (statements), respectively, to measure health, home, social, and emotional areas of adjustment. The stimulus situations and details of this measure have already been described in the first study. Details of these retained measures may also be found in Appendix F.

Adjustment-Inventory. The Adjustment-Inventory (Hindi) which was developed by Asthana (1950) is primarily devised to serve as a quick screening device for use with Hindi knowing school and college students. It has been used successfully between ages 14 and above. The inventory in no way pretends to diagnosis the type of psychoneurotic disorder or to indicate the degree of adjustment in various areas of living. It merely attempts to segregate the poorly adjusted from those who are better adjusted and who may stand in need of psychodiagnostic study and counselling.

The Adjustment-Inventory is self-administering and has no fixed time limit though it takes about 30 minutes to answer. This inventory contains 40 items. To score a test record, one mark is awarded for 'No' and zero for 'Yes' responses, except for items 19 and 40 where scoring procedure is reverse. The number of 'Yes' answers constitutes the total score on the Adjustment Inventory,
The higher the percentile better is the adjustment. Those scoring around 13 or less would profit from counselling.

The split-half reliability for this scale was found to be .97. Item-analysis by bi-serial correlation technique using total test score as criterion measure revealed comparatively low validity for items 21 and 24. Consequently, these items were expunged when preparing the revised form of the inventory. Norms for test are separately given for males and females.

It may be noted that self-report inventory method was treated as different from the projective-inventory method. The former method used statements relating to the trait under measurement whereas in the latter statements were related to the characters and activities described in a story. Moreover, in self-report inventory, the subject is required to describe his personality disposition directly. In contrast, the stimulus situations of the projective-inventory method requires the subject to project his personality characteristics through an evaluation of the activities of the characters as were described in the statements. It is important to note here that Adjustment-Inventory (criterion measure) provides only a total score of adjustment. It does not provide separate scores for earlier mentioned areas of adjustment. Therefore, for
validity, health, home, social, and emotional areas of Adjustment Projective-Inventory, ratings by friends and parents were used as a criterion.

**Ratings.** The rating sheet for adjustment consisted of instructions and a description (rationale) of health, home, social, and emotional adjustment. Spaces were provided for writing the name of the subject and name of the ratee. Five response alternatives for each area were graded in a Likert format (see Appendix J). The friends and parents were required to rate their friend/son/daughter on the mentioned adjustment areas using five-point scale. Average ratings of the friends and parents on health, home, social, and emotional areas were considered as criterion scores.

Studies on peer assessment methods showed that peers or associates can contribute meaningful information relating to personality attributes (e.g., Anastasi, 1982; Borman, 1974; Klimoski & London, 1974; Lawler, 1967). Moreover, rating method has been found to provide feedback on performance of all group members (Kane & Lawler, 1978). Anastasi (1982) also reported that ratings by parents and friends would be appropriate criterion measures for determining the criterion-related validity. Due to these advantages, ratings by the parents and friends were used as a criterion measure in the present study for
evaluating validity of the four adjustments areas.

**Procedure**

All the subjects were tested on the Adjustment Projective-Inventory as well as on the corresponding criterion measure (i.e., Adjustment-Inventory) in two testing sessions. The details of the testing procedure are shown in Table 14.

**Table 14**

**Descriptions of the Testing Procedure.**

<table>
<thead>
<tr>
<th>Testing session</th>
<th>Test</th>
<th>Criterion Measure</th>
<th>Nature of Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Adjustment Projective Inventory (AdP-I)</td>
<td>(a) Adjustment Inventory (Asthana, 1950)</td>
<td>In group of 20-30 subjects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(b) Ratings by parents and friends on different adjustment areas.</td>
<td>Individual</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Interval of 25-30 days</td>
</tr>
<tr>
<td>II</td>
<td>Adjustment projective Inventory (AdP-I)</td>
<td>-</td>
<td>In groups of 20-30 subjects</td>
</tr>
</tbody>
</table>
In the beginning of each session, attempts were made to establish rapport with the subjects in the same way as was done in the tryout session. Then the Adjustment Projective-Inventory booklets (AdP-I) and a printed answer sheets were given to the subjects. They were asked to write down certain information about themselves at the top of the answer sheet. Once it was done, the instructions for Adjustment Projective-Inventory printed on the test booklet were read out and the subjects were asked to read this silently. The method for using the answer sheet was demonstrated on the blackboard. After all the subjects completed their task, they were administered the Adjustment Inventory (Asthana, 1950) and were asked to go ahead with the work. When all the subjects finished working on this scale, they were also asked to write down the names of their two close friends, in order of preference, who participated in this study or were reading in this institution or both. In this way, a total of 200 subjects were tested on Adjustment Projective-Inventory and the criterion measure. At the end of first testing session, the subjects were requested to attend one more session which had to meet after 25-30 days. The exact date and time was told to the subjects before they were dismissed.

In the meantime, investigator randomly selected 50 out of 200 subjects, who participated in this study for
rating purpose. Before going for ratings, investigator got the accurate information about the names and addresses of parents and friends of all the 50 subjects from answer sheets of Adjustment Projective Inventory. After this, investigator tried to meet the parents and friends of all the subjects personally and told them about the purpose of the present study and requested to help in rating. In this way, after establishing a rapport, Adjustment Rating Sheet was given to all the parents and friends individually. They were also given assurance that confidentiality of their ratings would be maintained. In order to guard against the possible sources of errors, the raters (friends and parents) were trained to follow a common meaning of the concept of adjustment and its areas such as, health, home, social, and emotional adjustment by a mutual discussion. In this way, ratings of 50 subjects were made by their parents and friends on Adjustment Rating Sheet.

The second session, which was held after an interval of 25-30 days, followed the same procedure, the same 200 subjects were again given the Adjustment Projective-Inventory. There was no time limit for any of the tests. The subjects took approximately two hours to complete this scale.

All testings (excluding ratings) in this study were carried out in a room at the D.A.V. Degree College,
Gorakhpur, under standardized conditions. At the end of the last session, the investigator thanked the subjects and distributed dot pens to them as an incentive for sparing their time for testing.

Scoring

The data on the final Adjustment Projective-Inventory were scored separately for each areas (health, home, social, and emotional) of adjustment following the corresponding scoring keys (see Appendix H). Subjects' responses on this scale in the second session (re-testing) were also scored following the same keys. The subjects' responses to Asthana Adjustment Inventory were scored following respective scoring key given in the manual. Average ratings of the parents and friends for subjects were recorded on each areas of adjustment separately. In this case, each subject received an average score of parents and friends ratings which was between 5 to 1 on each areas of adjustment. Each item (statement) of the final Adjustment Projective-Inventory was scored separately for each subjects following the scoring key of the AdP-I on each of the areas of adjustment for computing the Kuder-Richardson reliability.

The subject's adjustment in health, home, social, and emotional areas were measured by three independent measures (e.g., Projective-Inventory, Self-Report Inventory, and
Rating). These data were then utilized for examining the reliability (test-retest and Kuder-Richardson) and criterion-related validity of Adjustment Projective-Inventory.

RESULTS

The aim of the present study was to evaluate the reliability (test-retest and Kuder-Richardson) and criterion validity of the Adjustment Projective-Inventory. It was assumed that this newly developed scale would provide a separate measure of health, home, social, and emotional adjustment. For determining test-retest reliability, the Adjustment Projective-Inventory was administered to a group of 200 subjects twice with an interval of 25-30 days. Responses of subjects were scored following the key developed in study I. The Pearson product moment correlation coefficients for all the adjustment areas and the total scale were computed between above two sets of scores for determining the reliability. These correlation co-efficients are given in Table 15.

It is obvious from Table 15 that the newly developed Adjustment Projective-Inventory was found to be a very reliable inventory. High level of reliability coefficients were also found to be .69, .70, .61, .74, and .87 for the mentioned areas or sub scales of this projective-inventory respectively (see Table 15).
Table 15

Reliability and Validity Coefficients of Adjustment Projective-Inventory.

<table>
<thead>
<tr>
<th>Adjustment area</th>
<th>Test-retest Reliability (N = 200)</th>
<th>Kuder-Richardson Reliability (N = 200)</th>
<th>Validity Coefficient (N = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>.69</td>
<td>.61</td>
<td>.69</td>
</tr>
<tr>
<td>Home</td>
<td>.70</td>
<td>.65</td>
<td>.81</td>
</tr>
<tr>
<td>Social</td>
<td>.61</td>
<td>.71</td>
<td>.75</td>
</tr>
<tr>
<td>Emotional</td>
<td>.74</td>
<td>.69</td>
<td>.82</td>
</tr>
<tr>
<td>Total</td>
<td>.87</td>
<td>.60</td>
<td>.85</td>
</tr>
</tbody>
</table>

The data of the same 200 subjects on Adjustment Projective-Inventory of the first session were used to determine the Kuder-Richardson reliability. In this method, subjects' responses on each item (statements) were scored and the proportions of the subjects who passed and the proportions who did not pass on each item were also computed. After this, correlation co-efficients were computed by applying Kuder-Richardson Formula - 20 (see Table 15).

Table 15 indicates that Kuder-Richardson reliability were .61, .65, .71, .69, and .60 for health, home, social, emotional, and total Adjustment Projective-Inventory.
respectively. In fact, this type of reliability coefficient indicates the homogeneity of items within each of the areas of adjustment and of subscales within the total projective-inventory. These two types of reliabilities, which were computed for Adjustment Projective-Inventory suggest that this newly developed test of adjustment was found to be highly reliable.

To examine the criterion-related validity of Adjustment Projective-Inventory, subjects' responses on this scale and criterion measure (i.e., Asthana Adjustment-Inventory) were scored following the respective keys. The Pearson correlation coefficient was computed between the total scores of Adjustment Projective-Inventory and Asthana Adjustment Inventory for determining the validity coefficient. The validity coefficient between the above two sets of scores was found to be .76, which was very high suggesting satisfactory validity of the Adjustment Projective-Inventory. But this validity coefficient does not indicate the validity of sub-inventories or each areas of adjustment separately. Asthana Adjustment-Inventory provides only a total score of adjustment. However, average rating scores by parents and friends of the subjects were used as a criterion measure for sub-inventories of Adjustment Projective-Inventory separately. The Pearson product moment correlation coefficients were also computed between
subjects' Adjustment Projective-Inventory score for each adjustment area and corresponding ratings. These correlation co-efficients are given in Table 15.

These validity co-efficients using rating as the criterion were found to be .69, .81, .75, .82, and .85 for health, home, social, emotional, and total Adjustment Projective-Inventory, respectively, all of which were quite high.

DISCUSSION

The present study was conducted to examine the reliability and validity of Adjustment Projective-Inventory for measuring the adjustment in areas of health, home, social, and emotional. It is obvious from foregoing sections that both reliability and validity are basic requirements of a psychological test (e.g., Anastasi, 1932; Ghiselli, 1962; Nunnally, 1981). Therefore, it was necessary to determine the reliability and validity of this newly developed test which was based on a new approach. It is important to note that validity and reliability of a test are very different requirements. These two requirements answer very different questions and are important on their own right. It is not surprising therefore that a test may provide us absolutely consistent or reliable information about an individual which may be absolutely invalid for the
The reliability of newly developed adjustment projective-inventory was determined by test-retest and Kuder-Richardson methods. As stated earlier, it was difficult to develop an alternate form for this type of inventory or to divide the test items into equal parts.

Test-retest reliability of Adjustment Projective-Inventory was found to be very satisfactory (r = 0.87). The test-retest reliability for health, home, social, and emotional were found to be .69, .70, .61 and .74, respectively (see Table 15). All these reliability coefficients were quite high. It means that all these measures (e.g., AdP-I and subprojective-inventories for measuring, health, home, social, and emotional) were very reliable. High reliability of this kind tells us that the individuals remain rather uniform, or maintain their rank positions inspite of changes in whatever psychological functions this test measures. A low re-test reliability coefficient means that the function or functions measured fluctuate from time to time or the test as an instrument is affected by other things that fluctuate. Then this newly developed Adjustment Projective-Inventory was administered to the same group of subjects twice with an interval of 25-30 days. In this way, two sets of scores (e.g., one for first testing or and another for second testing) were
obtained and correlation coefficients were computed between the two sets of scores. It was found to be .87 for the whole scale. It means, the subjects remained rather uniform or maintained their rank positions across the testing sessions which indicate the stability of the Adjustment Projective-Inventory's total scores. As stated earlier, this Adjustment projective-inventory provides separate measures for health, home, social, and emotional adjustment. For this purpose, two stories with 60-69 items (statements) were written for measuring each area of adjustment separately (see Appendix A). Therefore, it may be said that these scales (projective-inventories) are subscales (sub projective-inventories) of adjustment projective inventory. The results of this study also indicate that these sub projective-inventories also have a high reliability coefficients.

Some authors (i.e. Anastasi, 1982; Brown, 1970; Ghiselli, 1964; Guilford, 1975; Nunnally, 1981) reported that there are some serious defects in employing the retest method. The major defect is that experience in the first testing usually will influence responses in the second testing. To the extent, responses of the first testing are remembered, they will tend to be repeated on the retest. Also the individual will tend to repeat work habits and make much the same guesses on items where she or he is unsure. This makes the correlation between
testings 'higher. In the present study, an attempt was made to eliminate above mentioned defects by having a long interval of 25-30 days between first and second testings. Therefore, the correlation coefficients which were found by retest method for the Adjustment Projective-Inventory appear satisfactory because the subjects' experience in the first testing had minimum scope to influence their responses in second testing.

Another difficulty which is found with the retest method is that it does not fit very well into the domain-sampling model (Nunnally, 1981). According to this model, the reliability of any fixed length test is strictly a function of the average correlation among the items. The reason the retest method does not fit the model is that the retest correlation is only partly dependent on the correlations among items within a test. Even if the items within each test correlate zero on the average with one another, it still would be possible to obtain a positive correlation between scores in the two testings. The numerator of the correlations of sums is the sum of all the cross covariances (correlations, if scores are standarized) between the two sets of items being summed. Even if all the cross correlations between different items were zero, each item might correlate well with itself on two testings. Such correlations would be expected to be much higher than
those usually round between different items, and they could produce a substantial but misleading correlation between test and retest. In the present study, which was conducted for computing the test-retest reliability of the Adjustment Projective-Inventory, no attempt was made for eliminating this type of difficulty. However, this newly developed scale seems to have a high level of reliability ($r = .87$). It means, we can say that 87% of the variability in obtained scores is due to the differences in the true scores and only 13% is due to errors of measurement. Kuder-Richardson reliability was also computed for the Adjustment Projective-Inventory to measure health, home, social, and emotional areas to find out the internal consistency of a test. The result of this study also indicates a high level of correlation coefficient ($r = .60$) of the Adjustment Projective Inventory. A high level of reliability coefficients were also found for health, home, social, and emotional areas of adjustment. These reliability coefficients were .61, .65, .71, and .69, respectively (see Table 15). The reliability coefficient tells us directly the proportion of variance that is due to variance in true scores and the proportion that is due to measurement error. In this study, the reliability coefficient of Adjustment Projective Inventory for measuring Health was .61 suggesting 61% of its variability on the
obtained scores is due to differences in the true scores and only 39% is due to errors of measurement. Like this, all reliabilities coefficients for each of the mentioned measures may be interpreted in terms of true variance and error variance.

The Kuder-Richardson reliability measures the internal consistency of the test and internal consistency of a test is a measure of homogeneity of test items, and homogeneity can thus be defined in terms of consistency of performance over all items in a test (Loevinger, 1957; Anastasi, 1982). One basic assumption of the Kuder-Richardson formula is that the items on the test measure one common trait or factor. To the degree that the test items are heterogeneous the value of $r_{tt}$ as computed by K-R 20, will be lower.

The results of this study indicate that adjustment projective inventory for measuring social area seems to have the highest correlation coefficient among all measures. It means, the items (statements) of this sub-projective-inventory are homogeneous because the correlation coefficient was found to be .71. The items of other sub adjustment projective-inventories such as home, health, and emotional are also homogenous because the correlation coefficients were found to be .65, .61, and .69, respectively. On the basis of these results, it may
be concluded that the items of health adjustment inventory would measure only one area of adjustment viz., health. Likewise home, social, and emotional adjustment projective-inventories would measure only home, social, and emotional adjustment, respectively. But on the other hand, the correlation coefficient of Adjustment Projective-Inventory (total adjustment) was found to be .60. It may be pointed out that this reliability coefficient is lower than the reliability of its component measures (see Table 15). Because a sub-inventory is composed of items of similar in content and the various sub-inventories will differ from one another in content, the homogeneity (internal consistency) of a sub-inventory should be logically higher than that of the total scale - a fact substantiated from the results of the present study.

The results of this study also indicate that the reliability coefficients by retest method are higher than the Kuder-Richardson reliabilities of Adjustment Projective-Inventory (see Table 15). But these differences in correlation coefficients between above two methods do not appear significant excluding for Adjustment Projective Inventory (total). These insignificant differences in correlation coefficient were found due to practice effect of subjects and domain-sampling model which were discussed earlier as the difficulties with the retest method. It was
also assumed that these defects would increase the reliability coefficient of retest method (Nunnally, 1982). Many authors (e.g., Anastasi, 1982; Brown, 1970; Guilford, 1975; Nunnally, 1981) reported that the reliability of the sub-test scores will almost certainly be lower than that of the composite score. Similar results were found in the present study (see Table 15). But in the case of Kuder-Richardson method, the homogeneity (internal consistency) of a sub-test should theoretically be higher than that of the total score. This type of results were also found in this present study (see Table 15). This table shows that the reliability coefficients which were computed by Kuder-Richardson formula for sub-projective-inventories were higher than that of the total Adjustment Projective-Inventory score. The differences in reliability coefficients (which were obtained by two methods such as, retest and Kuder-Richardson on same sample) of Adjustment projective-inventory (total score) found in this study (see Table 15) can probably be attributed to this reason.

In the present study, criterion-related validity was computed for Adjustment Projective Inventory which was found to be as high as .76. Asthana Adjustment Inventory was used as criterion for determining the validity coefficient in this study. As reported earlier, this adjustment inventory (Asthana, 1962) actually measures some
areas of adjustment, but it provides a total scores of adjustment. Thus it was assumed that this criterion measure actually measures the areas of adjustment. It is obvious from the above discussion that the criterion measure (Asthana Adjustment Inventory) measures the areas of adjustment and the newly developed adjustment projective-inventory predicts the criterion (areas of adjustment) because correlation coefficient between newly developed Adjustment Projective-Inventory would also provide the measures of adjustment. Therefore, it may be concluded that this newly developed Adjustment Projective-Inventory measures the areas of adjustment because it was designed to measure the areas of adjustment.

But it was also supposed that the Adjustment Projective-Inventory would provide a separate measure of adjustment such as health, home, social, and emotional. For computing the criterion-validity of these sub-projective-inventories separately average ratings score of parents and friends were used as a criterion score in this study because Asthana Adjustment Inventory provides only a total score of adjustment. The validity coefficient between newly developed Adjustment Projective-Inventory and average ratings scores of parents and friends were found to be .69, .81, .75, .82, and .85 for health, home, social, emotional, and total scores, respectively (see Table 15). Thus the results of this study
suggest that this newly developed projective-inventory will measure the four areas of adjustment such as health, home, social, and emotional effectively.

Although the results of the present study suggest the usefulness of the projective-inventory method to measure several personality attributes, the tests in the present form, need some improvements. First, only criterion-related validity coefficients were computed in the present study and it was found to be very high but convergent and discriminant validity (Campbell & Fiske, 1959) should also be computed for this projective-inventory. It has already been pointed out in the first study that in the items analyses stage, the effectiveness of each item needs to be assessed against the criteria of both convergence and discrimination. This procedure of item analysis is assumed to raise the convergent and discriminant validity of the projective-inventory method. Secondly, rating method was used as a criterion for validating (criterion-related) the Adjustment Projective-Inventory as no other appropriate objective criteria were available for this purpose. However, in the present study, attempts were made to train the raters (parents and friends) to follow a common standard for rating each individual. Even then it was noticed that ratings scores of the subjects were contaminated with the errors of bias or halo effects. Therefore, future studies...
with projective-inventory method should attempt to increase the validity of rating scale before using it as a criterion measure.

The results of the present study clearly indicate that this newly developed Adjustment-Projective Inventory seems to have a high level of reliability and validity for measuring the four areas of adjustment such as health, home, social, and emotional. But the basic objective of the present investigation was to examine the contribution of social desirability factor to a scale's score developed by projective-inventory method. Now that an Adjustment Projective-Inventory has been developed following this new technique for personality assessment, a third study (Study III) was conducted with this specific objective in view.