The present study entitled "Intellectual and Personality Correlates of Creativity" was conducted with a view to identifying such measures of intelligence and traits of personality that act as correlates of creativity and to finding out the developmental trends of creativity for girls in grades IX through XI. The study was advanced within the framework of the following hypothesis:

1. Creativity and intelligence are two distinguishable modes of the same intellectual functioning.
2. Though creativity and intelligence are distinguishable modes, they are not distinctly independent of each other. Instead, certain measures of creativity show overlap with certain other measures of intelligence. Implicit in this hypothesis is that the variance between certain measures of creativity and certain measures of intelligence can be accounted for by a common source or sources of variation which also explains the basis for coming across or identifying the intellectual correlates of creativity.
3. Unique constellations of traits of personality and measures of creativity exist in terms of common factors in different combinations.
4. Personality traits correlate significantly with different measures of creativity.
5. Measures of creativity combine with certain aspects of intelligence as measured by different sub-tests.
within personological context meaning thereby that measures of creativity, and intelligence and traits of personality cluster together in specific combinations yielding common factor/s.

6. Grade to grade (IX through XI grades) differences exist in mean scores on different measures of creativity.

The data were collected on a sample of 730 girls representing IX (N=281, Mean age = 13 years 11 months), X (N=246, Mean age = 14 years 11 months), and XI (N=203, Mean age = 15 years 5 months) grades of Higher Secondary Schools of urban areas in Punjab drawn on the basis of multi-staged randomization of clusters technique of sampling.

For this purpose, the Torrance Tests of Creative Thinking (TTCT): verbal form A and figural form A (Torrance, 1966a & 1966b), Raven's (1960) Standard Progressive Matrices, the Group Test of General Mental Ability (G/50) by Jalota and Singh (1967), the California Psychological Inventory (the CPI; Gough, 1964) and the Bernreuter Personality Inventory (the BPI; Bernreuter, 1935), were used.

The final data corresponded to scores on non-verbal intelligence; eight measures of verbal intelligence including sub-tests and total verbal intelligence; thirty one measures of verbal creativity representing fluency, flexibility, originality and creativity totals for each of the seven activities in TTCT: verbal form, as also for the total verbal creativity test battery (activity six was not scored for flexibility); eighteen measures of fluency, flexibility, originality, elaboration and creativity totals for each of the three individ
activities (activity one does not provide for scores on fluency and flexibility) in TTCT: figural form, and the total figural test battery (non-verbal creativity); scores on eighteen personality traits on the CPI and six traits on the 3Pl.

Descriptive statistics, namely, mean, median, mode, standard deviation, skewness and kurtosis were worked out so as to ascertain the nature of score distributions pertaining to each variable under consideration.

The results of the present study were an outcome of multivariate analyses which involved Rotellini's (1935) principal axes method of factorial analysis, varimax rotation method of factors, and Pearson's product moment correlations. In order to understand the factor structure of creativity and intelligence; creativity and personality; and creativity, intelligence and personality; three different intercorrelation matrices were computerized separately so as to get as pure structures as could be possible. Multiple correlations and corresponding regression equations were set up by taking total verbal creativity (V\textsubscript{CQ-T}) and total non-verbal creativity scores (NV\textsubscript{CT-T}) separately as criteria and non-verbal intelligence, total verbal intelligence, and twenty one of the twenty four personality traits as independent variables.

In addition to the above mentioned statistical techniques, the use of t-ratios was made for examining the position of high and low creative groups as identified on the basis of total verbal and total non-verbal creativity separately on different measures of intelligence and personality traits. The mean profiles of these groups were prepared for presenting a comparative picture of these
two groups on the measures of intelligence and different personality traits. The creative development (IX through XI grades) was seen by using t-ratios for testing the significance of differences between the mean scores of IX and X, X and XI and IX and XI grades. Developmental curves and ogives were also prepared.

In confirmation to the first and the second hypotheses, a 'General Factor of Intellectual Functioning' was obtained as a result of factorial analysis of correlation matrices involving measures of creativity and intelligence (vide Chapter V, p.157), and creativity, intelligence and personality (vide Chapter VIII, p.311), accounting for about 40 per cent of the common variance in the former and 33.3 per cent of total communality in the latter.

Varimax rotations enabled to separate a 'Group Factor of Verbal Creativity' and a 'Group Factor of Non-verbal Creativity' (vide Chapters VI, VII & VIII). Thus analyses revealed that both creativity and intelligence are two distinguishable modes of the same intellectual functioning yet at the same time they are not distinctly independent of each. This conclusion is akin to the concepts of 'cognitive style' (Witkin et al., 1954; Ausubel and Ausubel, 1955), 'modes of intellect' (Burt, 1962; Wallach and Kogan, 1965), patterning of styles (Gardner, 1964) and intellectual bias (Hudson, 1955). It further lends support to Cropley's (1969) comments that creativity and intelligence can usefully be conceptualized as two of possibly many ways of utilizing an undifferentiated, highly generalized underlying "power".
The results of factor analysis lend empirical support to obtaining intellectual correlates of creativity, which were further confirmed on the basis of significant correlations between the measures (fluency, flexibility, originality and creativity totals) of total verbal creativity and the measures (fluency, flexibility, originality, elaboration and creativity totals) of total non-verbal creativity on the one hand and non-verbal intelligence and total verbal intelligence on the other.

Analytical picture of correlations between the measures of each and every activity in verbal and figural (non-verbal) creativity test batteries on the one hand and non-verbal intelligence and all the measures of verbal intelligence, namely, number series, best answers, classifications, reasoning, analogies, vocabulary and synonyms and opposites on the other revealed, in most of the cases, that positive and significant relationship existed between the two sets of variables. Both verbal and non-verbal intelligence in this context may be considered as correlates of fluency, flexibility, originality and creativity totals on each verbal activity as well as summated scores for these measures on the total verbal creativity test battery. The correlation with regard to the measures of non-verbal creativity reflected the trend whereby both verbal and non-verbal intelligence seem to be favouring the element of elaboration in all the activities. Verbal intelligence was
also found to be a correlate of originality on Repeated Figures activity. In general, these results lead to infer that to conceive of intellectual correlates of creativity is justified empirically both on the basis of factor analysis as well as correlations.

The values of t-ratios for the top 25 per cent and the bottom 25 per cent cases as identified on the basis of total verbal creativity ($V_{CY-T}$) and total non-verbal creativity ($NV_{CY-T}$) separately were found to be significant at .01 level with regard to non-verbal intelligence, all the seven measures of verbal intelligence, and total verbal intelligence. The results indicated that the trend of differences accounted for by verbal and non-verbal creativity was nearly the same for non-verbal and verbal intelligence with its sub-scores, which implied that those high on creativity generally have a tendency to be high on intelligence.

In support of the third hypothesis relevant to personality correlates of creativity, the factor analysis of the correlation matrix related to the measures of creativity and personality traits on the CPI and the BPI revealed that the trait of Confidence in Oneself shared common factor variance with the 'Group Factor of Non-Verbal Creativity' (original factor III, in Chapter VII, p. 234) and that the traits of Confidence in Oneself, Neurotic Tendency, Introversion, Self-Control, Socialization, Sense of Well-Being and Community on the positive pole and Dominance-Submission and Self-Sufficiency on the negative pole contributed to
common factor variance with the original 'Factor of Elaboration' (original factor V, in Chapter VII, pp. 43-44). These results thus confirm the hypothesis that 'unique constellations of traits of personality and measures of creativity exist in terms of common factors in different combinations', and provide an empirical basis for identifying the personality correlates of creativity. This hypothesis was further confirmed by the presence of constellations of personality traits in conjunction with certain measures of creativity in original factors III, IV, V, IX, X and XI (vide Chapter VIII). The results of factorial analysis in this context also substantiated the structure of creativity as obtained in respect of the intellectual correlates (vide Chapter VI).

The fourth hypothesis that 'personality traits correlate significantly with different measures of creativity' was confirmed partially. In general, personality traits did not exhibit a consistent picture of correlations with all the measures of creativity in different activities. Although certain personality traits correlated with specific measures of creativity, yet all the traits of personality could not be considered as correlates of each and every measure of creativity.

The traits of Social Presence, Psychological-mindedness and Femininity did not correlate significantly with verbal creativity, whereas Capacity for Status, and Flexibility did not act as correlates of non-verbal creativity.
The obtained values of correlations (vide Tables 7.4 and 7.6) revealed that out of twenty four personality traits chosen in the study, verbal creativity is positively correlated with fifteen traits, namely, Sociability, Self-Acceptance, Sense of Well-Being, Responsibility, Socialization, Self-Control, Tolerance, Good Impression, Communality, Achievement via Conformance, Achievement via Independence, and Intellectual Efficiency on the CPI, and Self-Sufficiency, Dominance-Submission and Confidence in Oneself (low scorers are more self confident) on the BPI; and negatively correlated with six traits, namely, Dominance, Capacity for Status and Flexibility on the CPI, and Neurotic Tendency, Introversion and Sociability (high scorers are low on Sociability) on the BPI.

The obtained values vide Tables 7.5 and 7.7 revealed a positive correlation of non-verbal creativity with eighteen of the twenty four personality traits, namely, Dominance, Sociability, Social Presence, Self-Acceptance, Sense of Well-Being, Responsibility, Socialization, Self-Control, Tolerance, Good Impression, Communality, Achievement via Conformance, Achievement via Independence, Intellectual Efficiency and Psychological-mindedness on the CPI, and Self-Sufficiency, Dominance-Submission, and Confidence in Oneself (low scorer indicate high self-confidence) on the BPI; and negative correlation of non-verbal creativity with four traits, i.e., Feminity on the CPI, and Neurotic Tendency, Introversion, and Sociability (high scorers are low on Sociability) on the BPI.
High and low groups of creative girls as identified on the basis of total verbal creativity differed significantly in respect of Capacity for Status, Intellectual Efficiency and Flexibility, and when identified on the basis of total non-verbal creativity, the groups were found to be significantly differing on the personality traits of Self-Acceptance and Self-Sufficiency.

The fifth hypothesis was intended to identify the measures of creativity sharing common factor variance with specific cluster of the measures of intelligence and traits of personality. It was substantiated by the presence of original factor IV (*vide* Chapter VIII) which exhibited a constellation of all the measures of verbal intelligence, non-verbal intelligence and personality trait of Communality on the positive pole and another constellation of creativity measures of fluency on Product Improvement activity ($V_{P-4}$) and flexibility on Just Suppose activity ($V_{X-7}$) in conjunction with personality traits of Flexibility, Capacity for Status, and Achievement via Independence on the negative pole. This factor implied that the measures of intelligence, certain traits of personality, namely, Communality, Flexibility, Capacity for Status and Achievement via Independence, and creativity measures of fluency on Product Improvement activity and flexibility on Just Suppose activity represented one continuum. The presence of such a factor confirms the hypothesis that measures of creativity combine with certain aspects of intelligence as measured by different sub-tests within persono-
logical context meaning thereby that measures of creativity, and intelligence and traits of personality cluster together in specific combinations yielding common factor/s', although in a restricted manner. The factor structure obtained in this context substantiated the structures obtained earlier in respect of intellectual correlates and personality correlates of creativity (vide Chapters VI and VII respectively).

The values of multiple $R$ between non-verbal intelligence, verbal intelligence and twenty-one traits of personality as independent variables, and total verbal creativity ($V_{CY-T}$) and total non-verbal creativity ($N_{CY-T}$) taken separately as the criterion variables were found to be higher than the individual correlations between independent variables and verbal creativity and non-verbal creativity taken separately. It was, thus, obvious that these variables conjointly influenced verbal and non-verbal creativity accounting for higher correlations. Variables of non-verbal and verbal intelligence, Intellectual Efficiency, Good-Impressions, Achievement via Conformance, Self-Acceptance, Flexibility, Sense of Well-Being, Dominance on the CPI and the DPI, Communality, Confidence in Oneself, Sociability on the BPI, and Femininity were found to be accounting for positive weights and Sociability on the CPI, Capacity for Status, Self-Control, Achievement via Independence, Introversion, Self-Sufficiency and Tolerance had negative weights in the prediction of verbal creativity; and variables
of verbal and non-verbal intelligence, Good-Impression, Self-Acceptance, Dominance on the CPI and the BPI, Tolerance, Socialization, Intellectual Efficiency, Self-Sufficiency, Community, Femininity, Neurotic Tendency, Confidence in Self, and sense of Well-Being meaningfully contributed to positive weights and Self-Control, Achievement via Conformance, Sociability on the CPI, Achievement via Independence, Introversion, Capacity for Status, Flexibility and Self-Sufficiency had negative weights in the prediction of non-verbal creativity.

Referring to the creative development as related to grades IX through XI, it was found that a consistent increase in the mean scores from IX to X grades on all the measures of verbal and non-verbal creativity was noticeable meaning thereby that creative development takes place on all measures until about the age of fifteen years. Measures of verbal creativity showed a decline from X to XI grade with the exception of flexibility on Unusual Uses activity five in which case it presented a levelling with the X grade, whereas measures of non-verbal creativity showed an upping trend of development from X to XI grade in respect of fluency and flexibility on the second activity (Incomplete Figures activity), originality and creativity totals on the third activity (Repeated Figures activity), and fluency and flexibility on the total figural test battery. The remaining measures indicated a decline from X to XI grade. The differences between the mean scores of X and XI grade girls in respect of the measures of non-verbal
creativity were, however, all found to be non-significant with the exception of originality, elaboration and creativity totals on activity one (Picture Construction activity) and elaboration on activity two (Incomplete Figures activity). All other factors ignored, it appeared that verbal creativity showed a decline in its growth after the age of about fifteen years whereas some of the measures of non-verbal creativity tended to develop even beyond the age of fifteen years. In this context, the last hypothesis that grade to grade (IX through XI grades) differences exist in mean scores on different measures of creativity was held tenable partially. It was confirmed in respect of mean differences between IX and X grade girls but was not confirmed in totality when referred to the differences between X and XI grades.