CREATIVITY AND INTELLIGENCE

Controversy as to the relationship between creativity and intelligence as reflected by research evidence, according to Foster (1971) centers around two standpoints, whereby (1) creativity is proposed to be a distinct aspect of intellectual functioning which is for all practical purposes independent of conventional intelligence, and (2) it depends upon unique cognitive factors which function within the hierarchical structure of intelligence (Vernon, 1950).

The first position has been favoured by several authors. They suggest two distinct aspects of intellectual functioning which, according to Guilford (1950), may appropriately be labelled as "convergent thinking" and "divergent thinking." Getzels and Jackson (1962) and Torrance (1963b) maintain that conventional intelligence tests are only useful for the measurement of the first kind of capacity (convergent thinking) and not for the second kind (divergent thinking).

Drawing attention to the neglect of creativity, Guilford (1950) predicts the relationship between creativity and intelligence to be low, which has been investigated through various correlational studies. Getzels and Jackson (1962) report positive but low correlations (.132 to .378) between measures of creativity on the one hand and intelligence on
the other, which leads one to infer that while creativity is slightly related to intelligence, it really constitutes a separate cognitive factor which owes little to conventional intelligence. It may, however, be pointed out that in Getzels and Jackson's sample, the high creative group which was selected in such a way as to exclude students of really high IQ, still had an average IQ of 127. Torrance (1962), in his partial replications of Getzels and Jackson's study, does not come across significant differences in the achievement of high creative and high intelligence group in six out of eight such replications. Here again, the groups were highly selective covering a small ability range representing the upper twenty per cent on either of the creativity or IQ measures. Lait (1964) also lends support to Getzels and Jackson's results. Ripple and May (1962), and Yamamoto (1965) tested some of the issues raised by Getzels and Jackson. Their results do not conform to the view that creativity is an entity independent of other facets of human intellect.

Earlier, Andrews (1930) made a mention of the correlations equal to .15, .02, and .03 between intelligence scores and three imagination test scores earned by the pre-school children. Welch (1946) finds a correlation of .27 between originality and Wonderlic Intelligence Test. Likewise, Meir and Stein (1955), Phatak (1962), Torrance (1962), Altenhause (1964), Richards et al. (1964), Seitz (1964), Wodtke (1964), Casey (1965),
Cropley (1965b), Guilford and Hoepfner (1966), Hudson (1966) and Madaus (1967b) report low positive correlations between measures of creativity and intelligence. Flescher (1968) makes a mention of negative low correlations between some measures of creativity and measures of intelligence. The summary of all available evidence involving 178 correlation coefficients reported in the literature on the question of relationship of creativity to intelligence shows the median correlation to be equal to .20 (Torrance, 1967a).

Probing further beyond the realm of correlational studies, Guilford et al. (1951, 1982), Wilson et al. (1954), and Cropley (1966) demonstrate the existence of distinct factors of creativity and intelligence through factor analytic studies. Wallach and Kogan (1965), using the approach based on Mednick's (1962) concept of creativity in terms of providing unusual associations and relationships, identify an isolated aspect of thinking which stands apart from the traditional concept of general intelligence. Ward (1967), with the help of oblique rotation supports Wallach and Kogan's point of view and, in addition, maintains that creativity itself possesses multi-factor structure. Fee (1968) remarks that creativity dimension is relatively independent of general ability. Wallach and Wing (1969) find clear replications of the findings of Wallach and Kogan (1965) regarding the separation of creativity from intelligence.
Factor analytic investigation by Cropley and Maslany (1969) indicates the existence of large loadings of creativity on intelligence. However, the failure of Cropley and Maslany to establish the independence of creativity from intelligence is attributed by Kogan (1971) to the failure to rotate. A promax rotation of Cropley-Maslany principal component solution by Kogan has yielded pure creativity factor besides two intelligence factors. In the same way, Dacey and Madaus (1971) also report the emergence of divergent thinking and intelligence as separate dimensions. Other studies favouring evidence of creativity as a separate dimension of intellectual functioning are due to Sultan (1962), Yamamoto (1964a), and Anderson (1965).

The studies supporting the second standpoint that creativity results largely from the operation of general ability contain both original work and critical appraisal of other studies. Wall (1960) postulates that creativity and is likely to result from a well stored mind that relatively high intelligence is necessary for this as well as fineness of perception. Burt (1962 & 1964) points out that there is no agreement among theorists as to whether there is a separate intellectual capacity appropriately labelled as 'creativity' or 'divergent-thinking'. He argues in the tradition of Galton (1883) that creative production may chiefly be attributed to the operation of general ability.
rather than differences on some separate and distinct intellectual skill, appropriately identified by the label 'creativity'. Thorndike (1963) and Marsh (1964) fail to obtain clearly defined IQ-independent factor of creativity and where such factors have been obtained, they have tended to derive a great deal of their variance from conventional measures (Thorndike 1963b, Cropley, 1965a & 1966) or to be only minor factors (Sultan, 1962). Gardner (1964) and Wallon (1964) decry the tendency to over-generalize findings to employ that creativity and intelligence are different and to forget the lack of reliability and validity in the present creativity tests. McNemar (1964) suggests that the usefulness of conventional tests can be extended by adding divergent thinking sub-tests to them.

Furthermore, the position adopted by above cited authors is strongly supported by many studies reporting significant correlations between measures of creativity and intelligence. Ketcham and Kheiralla (1962) find fifty four out of sixty four correlations between the scores on WISC, Stanford-Binet and PMA tests on the one hand and scores on a battery of creativity tests on the other to be significant beyond .05 level. Hasan and Butcher (1966) report a correlation as high as .74 between the two constructs for Scottish children. Lovell and Shields (1967)
demonstrate that among children, with WISC verbal scores of 140 or more and aged five years to eleven years and seven months, the evidence indicates that after a general factor is extracted from an appropriate battery of intelligence, attainment tests and tests of logical thinking, only a moderate amount of variability in the 'creativity test performance is left over for distribution among a number of further small factors. Likewise, Ginsberg and Whittemore (1968) obtain a correlation of .60 for an Australian sample and conclude that tests of creativity and intelligence measure somewhat different albeit overlapping abilities and warn that the case for creative thinking should not be overstated. However, Madaus (1967a, 1967b), Dacey et al. (1969) and Dacey and Madaus (1971) attribute the phenomenon of high correlation to the interactional effect between the method factor related to both the measures rather than to a higher correlation between the two. Commenting upon the relationship between divergent thinking and convergent thinking, Cropley (1965, & 1966) concludes that the two skills represent overlapping aspects of intellectual functioning which probably interact in creative production and that high scores on tests of divergent thinking would tend to be accompanied by high scores on tests of convergent thinking and vice-versa, although the two kinds of thinking are not identical. He further explains the
relationship by making use of oblique factor rotations and reports that creativity factor is almost totally independent of convergent tests but substantially correlated (.514) with the factor of conventional intelligence. Defining creativity through instruments developed by Torrance and Guilford measuring fluency, flexibility, originality and elaboration, Cave (1970) investigated the creativity—intelligence relationship by using promax factor rotation scheme and identified factors representing creativity, verbal relations and non-verbal reasoning. Although a distinct creativity factor was found, the intercorrelations among the promax factors were quite substantial. Cave reports correlations of .61 and .66 between creativity and verbal relations, and creativity and non-verbal reasoning factors respectively. These results suggest that creativity as operationally defined by Cave may be somewhere between the proposition that creativity is independent of intelligence and that creativity is basically part of abstract intelligence. Replicating Cave's study by employing both the Torrance Tests of Creativity and Wallach and Kogan's tests, Kazelskis et al. (1972) conform to the proposition that creativity and intelligence are two distinctly identifiable dimensions. Correlation between the traditional creativity factor and intelligence was quite substantial (.66) and in keeping with the results of Cave's study. Although the correlation between the Wallach and Kogan
creativity factor and the intelligence factor was low (.325), the correlation is higher than that of the previous researches by Fee (1968), & Hogan (1971). With the help of principal component factor analysis accompanied by varimax and promax rotation to identify the nature of relationship between creativity and intelligence, Foster (1971) arrives at a conclusion that tests of creativity measure different attributes from those measured in conventional tests of intelligence and that the two sets of measures have some variance in common which may be attributed to general mental ability. The evidence of this study is against the suggestion that 'creativity as a dimensional aspect of ability is a distinct group factor'. His findings conform to the view that creativity is highly complex involving constituent sub-factors which reveal themselves as specific content factors.

A number of useful ways in conceptualizing the relationship of creativity and intelligence have been proposed. While Guilford (1950) suggests that each involved a special cluster of skills, Pribram (1964) argues that creative thinking probably arises out of extension of conventional thinking so that conventional intelligence is the basis out of which creativity arises.

Some researchers attempt to test the threshold hypothesis basically derived from McClelland's (1958) formulation concerning the relationship between IQ and
academic achievement. Anderson (1960) proposes that there may be substantial correlation between IQ and creativity at lower intelligence levels but that once some critical IQ level has been reached creativity functions independently. Taylor (1964) and Vernon (1964) also substantiate this viewpoint by stating that creativity and intelligence become independent of each other only when some critical level of IQ has been exceeded. Barron (1969) observes that a specific minimum IQ is probably necessary for certain intrinsically creative activities in order to engage in the activity at all, but beyond that minimum which often is surprisingly low, creativity has little correlation with scores on IQ tests. The threshold point - a critical level of IQ beyond which creativity and intelligence become independent of each other, has been reported above a percentile of ninety five by Meer and Stein (1955), and IQ of 120 by Barron (1961), Torrance (1962), and Yamamoto (1964).

The hypothesis that creativity and intelligence become independent of each other beyond a certain adequate IQ level has been examined in various correlational studies. Taylor and Holland (1962) find no correlation between creativity and intelligence at higher ability level and report positive correlations varying between .20 to .40 in a large number of investigations covering unrestricted
range of intelligence. Yamamoto (1965) finds a correlation of .31 between two variables for a group of American fifth graders whose IQs were all below ninety, while the value of correlation coefficient had fallen to -.02 for subjects having IQs of 130. Likewise, Yamamoto (1965) obtains a correlation of .35 between creativity and intelligence for students with IQ below ninety, but the size of the correlation decreased linearly for higher IQ groups and reached a near zero level when IQs were above 130. Dacey and Madaus (1971), studying the relationship at three levels of IQ in three diverse populations, obtain different correlations at different levels (the highest 'r' being .57). The results confirm the contention that the relationship between creativity and intelligence throughout the entire range of IQ is not the same. These findings have implications for the possibility of thinking in terms of a threshold or a critical level of IQ, beyond which creativity operates independently. Cicirelli (1965), however, finds a weak support for the threshold hypothesis.

Hence, the position regarding the relationship between creativity and intelligence may be summed up as follows:

Quite an enthusiasm has been shown to validate the supposition that creativity is a new dimension of intellect independent of intelligence. This point of view, however, has
been increasingly difficult to maintain in the presence of consistently significant correlations between creativity tests and conventional tests of intelligence. Factor analytic studies have yielded creativity factors which seem to be heavily contaminated with variance derived from tests of intelligence. Efforts have also been made to obtain pure factors of creativity by the use of oblique pronax rotations but the reported evidence shows that such factors of creativity correlate considerably with conventional intelligence factors.

CREATIVITY AND PERSONALITY

After having examined the relationship between creativity and intelligence, it is proposed to review the research studies concerning creativity and personality in this section.

It has been argued that creative behaviour depends as much on personality as on cognitive power which is evidenced by the comments of various authors given here. Hargreaves (1927) recognizes a conative factor in the cognitive process of verbal fluency accounting for the individual variance in his experimental study. Cattell (1934) thinks it appropriate to rename his tests of imagination as tests of temperament. The significance of non-cognitive factors in identifying the special characteristics of the gifted has also been recognized by Terman (1954). He emphasizes that the special characteristics of gifted men pervade not only cognitive modes
but also temperamental and even moral spheres. According to Getzels and Jackson (1962) the important distinction between the highly creative and highly intelligent adolescents does not confine to the cognitive spheres alone but it embraces the temperamental characteristics as well. The interaction of personality and creativity has been evidenced by Wallach and Kogan (1965) in their studies of young children. Freeman et al. (1969) point out that the differences in creativity seem likely to be related more to non-cognitive than cognitive traits.

There is yet another point of view which stresses that creativity itself is to be understood in terms of personality or in a sense, the person himself. Allport (1937) recognizes the significance of assumption of creative motive from functional autonomy in the individual. Goldstein (1939) stresses the tendency to effectuate a realization of one's nature in creative environment. May (1959) regards the truly creative to be the manifestation of one's filling his own being in the world. In a similar vein, Rogers (1962) attributes creativity to the encounter between the uniqueness of the individual and his milieu. Recognizing the theoretical views presented by various authors, Maslow et al. (1945) and Maslow (1954 & 1962) make a distinction between special talent creativeness and self-actualizing creativeness. The former refers to product and attitude, while the latter typifies openness to experience. Self-actualizing creativity stresses personality rather than
achievement. The latter, according to Maslow is to be regarded as epiphenomena emitted by the personality and therefore secondary to it. In contrast to Maslow, Mackinnon (1962a, 1963, 1965, 1967 and 1970) places much premium on the criterion of achievement accomplished by men in different fields for identifying creative individuals. He finds considerable evidence in biographical, temperamental and motivational factors for identifying creativity.

Barron (1963 & 1965) suggests originality to be almost habitual as some are regularly original whereas others are regularly unoriginal. He presupposes certain patterns of relatively enduring traits to facilitate or impede such original acts. The presence of these traits in an individual predisposes him towards originality. Guillem (1968) places so much premium on personality variables that he goes to the extent of claiming the use of these variables as criterion in the study of creativity.

The role of personality in creativity has been recognized in numerous investigations. Galton (1869 & 1874) is perhaps one of the forerunners to initiate empirical research on the problem of creativity - personality relationship. He finds geniuses and eminent men to be distinguished by the originality of their ideas, that is, fluency and freedom of their associations. In a similar study on men of genius in Britain with a special reference to psychopathology, Ellis (1904) observes
the incidence of psychosis among them to be no greater than in a general population.

Terman (1954) in the two contrasted groups of men rated highest and lowest for success in life in terms of the extent to which one has made use of one's superior intellectual ability, finds the high group characterized by a well-balanced temperament and freedom from excessive frustrations, and significantly different from the low group with regard to drive to achieve and all round mental and social development. In a series of studies on artists, painters, physicists and a group of eminent scientists in special fields Roe (1946a, 1946b, 1951a, 1951b & 1953) reveals that the creative artists possess a characteristic emotional adaptation which is non-aggressive, rather passive in nature, and somewhat more feminine than masculine by the American culture stereotype; that the anxious, the cautious and the compulsive painters do not use colours freely or brilliantly or for fun; that the physicists are, particularly as children, very withdrawn and are frequently social isolates; and that the scientists tend strongly to abstractions and to formalize their objective thinking. The scientists are characterized by marked inhibition of any tendencies to project themselves into situation. They are found to be resembling with painters in being better adjusted emotionally. Guilford (1959) remarks that the Roe's (1946a, 1946b & 1953) studies of
Leading scientists manifest one temperamental trait to be universal — a willingness to work hard and to work for long hours. He, however, points out that no indication to the unique relationship between this trait and creativity is reflected.

In several studies related to creativity and personality, the psychoanalytic approach has been taken as focal. Munsterberg and Mussen (1908) studied the personality structure of art students in their attempt to test the hypotheses derived from the psychoanalytic formulations. They find artists to have guilt feelings, traits of introversion, a richer inner life, and an unwillingness to comply to their parents in childhood as compared to their non-artist counterparts. Their findings point out that non-artists are not likely to show over-aggressive tendencies. Appreciation of the product is found to supply basic narcissistic gratification for the artist. Kubie (1958) is of the view that preconscious system is the essential implement of all creative activity. Analysing a number of case histories, he concludes that neurosis corrupts, mars, distorts, and blocks creativeness in every field of human endeavour. Basing his study on psychoanalytic theory, Nyden (1989) tried to identify and evaluate certain personality characteristics of individuals of recognized creativity and compare them with the personality characteristics of a group of business and professional people. The quantitative and qualitative evaluations led to a characterization of the creative artist as a person of
superior intellect who functions close to his potential, intellectually oriented towards the outer world with a richer inner life and a strong sense of his "role in life", healthily non-conforming; interested in achievement and sexually more ambivalent (probably due to lack of repression of id feelings). These findings may be interpreted in a way as to support Freud's (1949) notion that creative persons have easier access to primary processes and therefore less repression and more psychic energy. In their study on a group of gifted children by using items from Minnesota Battery of Creativity Tests as criterion and by studying personality through interviews and projective techniques, Welsberg and Springer (1961) find that the high creative group is rated higher than the less creative ones on strength of self-image, ease of early recall, humour, availability of oedipal anxiety and uneven ego development.

A group of studies by Cattell and his associates provide evidence in support of elucidating a theory of creativity within the personality context. Analyzing the biographies of scientists and combining evidence from quantitative work and qualitative observations, Cattell (1954 & 1968) concludes that scientific researchers are generally found to be schizothyme, withdrawn, skeptical, internally pre-occupied, precise and reliable. The average level of ego strength and emotional stability is distinctly higher for the effective scientific researchers than for the
general population. They are also characterized by high anxiety level, high irritability and excitability, and are found to be desurgent as compared to artists, businessmen and others. A high general inhibition combined with a high level of resource and adaptability among the scientific researchers is also noticeable. The study by Cattell (1939) on 144 physicists, biologists and psychologists leads to arrive at three conclusions, namely, (1) the personality profile of these researchers differ significantly at .01 level from that of average man in as much as that they are more schizothymic, intelligent, dominant, inhibited, emotionally sensitive and radical, and they are more given to controlling their behaviour by an exacting self-concept; (2) the researcher's personality profile differs from those of person's of equal general intelligence who are outstanding in administration and teaching in the sense that former are more schizothymic, less emotionally stable, more radical, and uniformly lower on all primary personality factors of extraversion; and finally (3) the researcher's profiles when compared with those of persons eminent in literature and decorative arts are found to be more schizothymic, intelligent, dominant, desurgent, radical and self-sufficient than average. In an attempt to compare personality patterns of research scientists in American universities with those of university teachers and administrators and also with the average scores of the general population, Cattell and Brevdahl (1955) observe the research scientists to be
significantly high on factors of schizothymia (Factor A) and self-sufficiency (Factor B) as contrasted with a college group of administrators. The differences in schizothymia and self-sufficiency have also been noticed in a comparison of creative and non-creative students in science and art subjects by Drevdahl (1956) but no significant differences between the creative and non-creative groups exist on the factor of intelligence versus mental defect; ego-strength versus lack of internal standards; adventurous cyclothymia versus withdrawn schizothymia; emotional sensitivity versus maturity; bohemianism versus practical concernedness; sophistication versus simplicity; anxious insecurity versus self-confidence; and will control and stability versus nervous tension. However, the creative groups are found to be higher than the non-creatives on the factors of radicalism versus conservatism and self-sufficiency versus lack of resolution; and lower on the factors of cyclothymia versus schizothymia and surgency versus desurgency. Thus the creative persons in the studies referred to above appear to be considerably more withdrawn and quiescent than the non-creative persons. In yet another study by Drevdahl (1964) the creative group of psychologists appear to be more interested in scientific investigation than in a more socially oriented activity. They are characterized by a relative unconcern of other people, authority, rules, regulations, restrictions, and the like, indicating a definite degree of
independence. Their personal, social and emotional adjustment is found to be superior to that of their less eminent counterparts; however, by no means close to perfect. They are usually self-oriented without showing concern to such things as social and sexual relationships, public, and professional criticism. Moral and social responsibility is generally accepted by them without overconcern. In other studies by Brevda and Cattell (1958) on artists and writers and Cross et al. (1967) on creative artist, results confirming the findings by Cattell (1959) have been obtained. In general all these studies reveal the creative person to be introverted and anxious, and having a high degree of ego strength. Cross et al. (1967) further remark that the artists differ on twelve out of fifteen factors (intelligence excluded) of the 16 PF, particularly in being more dominant and intellectually self-sufficient. One of the largest differences has been noticed on autistic or bohemian tendency and historical unconcern (Factor H). White (1968) finds a distinction between personality correlates of creative behaviour as determined by known groups of creative individuals as opposed to creative individuals identified by divergent thinking tests in the sense that extraverts as defined by Cattell's 16 PF score higher on divergent thinking measures of fluency flexibility and originality than the introverts. The similar relationship is found between stable and neurotic personalities.
Attempts have been made to identify the personality structure of the creative person in a variety of professional areas by several workers at the Institute of Personality Assessment and Research, University of California, by mostly employing nomination and voting techniques for the selection of creative individuals. Mackinnon (1962a) in his sample of master architects as creative subjects finds them to enjoy sensuous experience, have social poise and presence, appear socially at ease, be genuinely dependable and responsible. They tend to be critical, skeptical, not easily impressed, and concerned with their own adequacy as a person. The architects exhibit the highest value in aesthetics and are almost equally high on theoretical values. The results of psychological tests demonstrate that the creative groups have greater psychopathology than the representative members of the same profession. The average creative architect is less marked by deviant behaviour, but is still consistently and substantially higher on the psychopathological dispositions and strikingly higher on ego-strength than general population. In another variation of the design, Mackinnon (1962b) recruited two additional samples (Group II and Group III), both of which matched the highly creative sample of nominated architects (Group I) with respect to age and geographic location of practice. Group II and III respectively represented less eminent architects associated with the first group, and
ordinary architects neither selected for eminence, nor associated with those who were eminent. A number of differences among these three groups have been reported. More than 80 per cent of the architects in Group I and less than 80 per cent of the architects in Group II describe themselves as inventive, determined, independent, individualistic, enthusiastic and industrious. The most striking aspect of the MMPI profiles of all the male creative groups demonstrate extremely high peak on the Mf (femininity) Scale of the California Psychological Inventory (Gough, 1957) and on the masculinity-femininity scale of the Strong vocational interest Blank (Strong, 1959). Scores on the latter scale (where high score indicates more masculinity) correlate to the extent of .49 with rated creativity. The evidence implies that "the more creative a person is, the more he reveals an openness to his own feelings and emotions, a sensitive intellect and understanding, self-awareness and wide ranging interests including many which in the American culture are thought of as feminine" (Mackinnon, 1962b).

Mathematicians and writers were also subjected to similar investigation and identical results have been obtained (Mackinnon, 1962b & Barron, 1965). Creative mathematicians are found to be significantly different from the representatives of their professions by being individualistic,
preoccupied, artistic, complicated, courageous, emotional, imaginative and self-centered. These creative mathematicians are high on both theoretical and aesthetic values. They are also high on the psychopathological measures of MMPI. Nevertheless, they have a high degree of ego-strength. For the creative writers, the results are similar to those obtained on architects and mathematicians. The creative writers are known to possess a high degree of intellectual ability, verbal fluency, and aesthetically reacting tendency. They value intellectual and cognitive matter and autonomy, and are found to be productive, concerned with philosophical problems and possessing a high level of aspiration, a wide range of interests and an unconventional thought process. This group, in itself, is interesting and arresting, straightforward in dealing with others, and consistent with standards of behaviour. The average creative writer is high on all the measures of psychopathology as compared to general population. In this case, creative individuals again are found to have high ego-strength. Helson and Crutchfield (1970a, 1970b) find creatives to be less defensive and report differences in personality and background correlates among five types of creative mathematicians identified on the basis of subject's own sort descriptions of their research style.

An interesting overlap with regard to the characteristics of the creatives is noticeable between the Mackinnon's (1962b) summarization quoted above and Taylor and Holland's (1964)
descriptions. The latter present the personality characteristics of creative persons as: autonomous, self-sufficient, independent in judgement, more open to the irrational, more stable, more feminine, dominant, self-assertive, complex, more self-accepting, more resourceful and adventurous, more bohemian, self-controlled, emotionally sensitive, introverted and bold.

Besides, a host of relevant studies conducted in diverse settings have been reported in research literature. It may not be feasible to review all of them. Nevertheless, attempts have been made to include some prominent ones here. Barron (1956) finds mean differences significant between originals and unoriginals on the trait of preference for complexity, psychodynamic complexity as a person, independence of judgement, CPI social dominance, and self-rating dominance. Clark (1965) reports the creatives to have rated themselves as more skeptical than college alumnus though they rate themselves average on faith. The highest rated contributory factors leading to creativity are interest and satisfaction in work for its own sake, desire to know and understand, desire to aid society and desire for new experience. Religious motivation is relatively low but it is noted that individuals tend to rate it either very high or very low to a greater extent than other factors, which may present a misleading picture in terms of averages. Stein (1936) studied industrial research chemists selected on the basis of composite ratings
on creativity by superiors, colleagues, and subordinates.

From the self-evaluation, it is revealed that more creative chemists tend to be more autonomous, strive for more distant goals, have more integrative attitudes, are more cautious and realistic, are more consistent in their desire for reward, have a more differentiated value hierarchy and perceive themselves as assertive and authoritative with leadership ability. Getzels and Jackson (1962), in their sample of twenty six high creative and twenty eight high intelligent adolescents selected from a group of 449 high school students on the basis of their performance, IQ, and summed scores on five creativity instruments, find the high IQ students using stereotype meanings and conventional standards of success and aspiring for conventional career, whereas high creative students diverge from stereotyped meanings, have unconventional standards of success and aspire for unconventional career. Creative group is also characterized by wide-ranging interests, sense of humour and emotional stability. Torrance (1962), in a comparison between highly creative children and their less creative controls, reports three personality characteristics, namely, reputation for producing wild or silly ideas, high degree of originality and humour, playfulness and relative relaxation characterizing highly creative children stood out as differentiators of the two groups.

By correlating seventy two personal, demographic and parental variables with high school grades and the check list
of creative science and creative arts items, Holland (1961) reports that the most valuable contrast in the creative and non-creative groups seem to be in the independence and associability of the creatives and the perseverance, sociability and responsibility of the non-creatives. Barron (1968) reports that persons scoring high on tests of originality are marked by freedom of expression, rebelliousness, disorderliness, exhibitionism, and independence of judgement. Those high on originality are also high on fluency, intelligence, intellectual orientation, ascendence, confidence, non-conformity, flexibility, quickness and wide interests. Summary presentation by Taylor and Baron (1963) of a collection of papers originally presented at the three Utah Conferences on Scientific Creativity reveals comprehensive results as reported by sub-groups studying environmental conditions, motivation and personality traits. According to them, the scientists are characterized by a high degree of autonomy, preference for mental manipulation involving things rather than people, high ego strength, emotional stability, liking for method and precision, preference for defense mechanisms such as repression and isolation, a high degree of personal dominance but a dislike for personally toned controversy, high degree of impulse control, a liking for abstract thinking with considerable tolerance for cognitive ambiguity, independence of judgement, superior general intelligence, an
early interest in intellectual activities, a drive toward comprehensiveness, elegance in explanation, and an interest in coping with uncertain circumstances. Torrance (1962) lists eighty-four characteristics collected from an extensive review of literature which differentiated highly creative persons from the less creative ones. The check list has been the basis for much subsequent work on refining the concept of creative personality. Holland and Laird (1968) predict expressiveness, originality, and non-conformity to be associated with the self-ratings of high scorers on creative attitude scale. Guilford (1959) concludes that individuals high on scores of ideational fluency tend to be more impulsive, more ascendant, and more confident. They show strong appreciation for creative products. Those who score higher on tests of expressional fluency incline to be more confident and tolerant of ambiguity and demonstrate liking for reflective and divergent thinking.

Taft and Gilchrist (1970) refer to productivity and creative attitude in his investigation and report that students scoring high on both of these aspects see themselves as unconventional, willing to take risks, impulsive, observant, imaginative, idealistic, concerned with beauty, having wide range of interests and subject to emotional conflicts. On an expression scale, they are high on emotional participation in external events. High scores on creative productivity
alone relate more to lack of self-control and neurotic symptoms. They describe themselves as having been unhappy as children and as having received medical attention for nervous or emotional complaints at some stage during their lives. In addition, they regard themselves as disorderly, impractical, and lacking in self-control. Thus those who are actively engaged in artistic and expressional nature appear as impractical, disorganized people, and are in conflict both within themselves and with their environment. This provides a strong hint that their artistic productivity may be a means for reducing tension from their inner conflicts. On the other hand, high scores on creativity attitude alone correlate positively with traits of self-actualizing and controlled regressive experiences. They report themselves to be extraverted, energetic, enthusiastic, inquisitive, intuitive, quick-witted and dependent. They have academic orientation towards theoretical and academic development.

The profile of creative personality emerging from Foster's (1971) research is one of sensitivity, introversion, tenderness, conscientiousness and apprehensiveness.

It is obvious from the review that there are many ways in which creative talents are discovered and encouraged and many avenues of development and characteristic to describe people having these abilities. However, one is led to agree with Nelson (1962) that no all-inclusive description will fit
and describe all, and no set of descriptions will be applicable to each individuals, which is further aggravated due to lack of rigid controls of testing, modes of obtaining information, and experimental conditions.

To sum up, the research on creativity and personality has largely depended upon historical and biographical data, experiments, clinical observations, psychological testing, statistical analyses and follow up studies. It is however, difficult to point out a replicated body of findings indicating that differences on standardized measures of personality are consistently related to measures on creativity in diverse fields. Majority of the attempts have been directed towards identifying certain personality characteristics of creative individual by employing different criteria which have failed to provide an over-arching theory from which one can deduce relationship between creativity and personality.

CREATIVE DEVELOPMENT

Despite frequent fluctuations of creative behaviour from person to person in the same group, certain common characteristics at a particular age may possibly be identified. Incidentally, the developmental curves for the abilities thought to be involved in the creative thinking follow a pattern which is not identical with most other aspects of human growth. For this reason, several workers have made observations concerning the process by which the creative thinking abilities
develop, usually without leading to systematic and consistent conclusions. Nevertheless, efforts have been made by various workers through cross-sectional studies to investigate into the developmental trends of creativity covering several years.

McMillon (1924) identifies three stages in the development of imagination characterized by a sense of beauty, a grip over the realities, and a beginning to work out by small degrees the ideal of the first vision of the world of things as they are to the person in the order of placement of the development sequence. Andrews (1930) reports total imaginative scores to be highest between the ages of four and four and a half years with a sudden drop at about the age of five. In contrast, Gripen (1933) concludes that creative imagination rarely begins functioning in childhood below the age of five years. Markey (1935) reveals the total amount of imaginative behaviour to be increasing with age throughout the pre-school period. Basing his conclusions upon ability to understand fully pictures and to interpret them as a whole, Vernon (1945) does not find constructive imagination to occur in the child of normal intelligence and emotional development until age eleven. Lally and Labrant (1951) observe that interest in art tends to decline at each educational level through the intermediate and upper grades and on into secondary school. Barkan (1960) observes greater spurts of growth at some points than at others in children. According to Wilt (1959) the decline in
creativity occurs during what she calls the stage of realism and 'gang age'.

Although developmental phenomena during the high school years have received little attention, most of the existing evidence according to Torrance (1962) is fairly consistent. Most investigators have reported a decline in imaginative functioning between the sixth and seventh grades and in some studies on into the eighth, followed by a period of fairly steady growth until about the end of high school period, at which time there is levelling off or a slight decline. In the Minnesota studies (Yamamoto, 1960; Torrance et al. 1960) a decline between the sixth and seventh grades followed by a fairly steady rise until the near end of the high school period has been reported. Bedner and Parker's (1965) findings also confirm the results of Minnesota studies. They further point out that exceptionally intelligent young adults do not show any significant change in the creativity test scores within the first three years of college.

Earlier, Lehman (1953) was of the view that the peak period of creativity falls in earlier part of one's life. In another study, Lehman (1956) observes that it is not age itself but the factors that accompany age-change that bring about a reduction in creative production.

The research on creative development, as mentioned earlier, cannot be claimed to be conclusive, hence a promise for further work in this area.
To conclude, the review of literature on creativity has thus far been organized mainly within two general trends: intellectual orientations, and personological approach. A brief account of creative development has also been given.

The review brings to focus certain fundamental controversies as to the nature of creativity and its relationship with intelligence and personality, thereby enabling to formulate the hypotheses.

**HYPOTHESES**

Confrontation with certain fundamental controversies as to the nature of creativity and its relationship with intelligence and personality as a result of review of related studies led to the formulation of the following hypotheses:

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 measures of intelligence. Implicit in this hypothesis is that the variance between certain measures of creativity and certain other 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 constellation 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 psychological 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 (I through XI grades) differences exist in mean scores on different measures of creativity.