CHAPTER 1
CHAPTER I

THE PROBLEM

The present study attempted to investigate the scholastic achievement of pupils in relation to their cognitive abilities. More specifically, it aimed at relating the achievement of pupils in school subjects to creativity and intelligence.

CONCEPT OF ACHIEVEMENT

The term 'Achievement' denotes accomplishments or attainments in any field, academic or non-academic; and 'Scholastic Achievement' refers to accomplishments of pupils in the academic domain as a result of undergoing a course in school for a specified duration.

A great deal of research designed to discover the extent to which intellectual and non-intellectual factors contribute to the academic success of pupils, have been carried out. These studies have, to a certain extent, used the observation methods, record-keeping over a certain period, the interview method,
the check-list method, and have largely utilized questionnaires and tests.

**FACTORS AFFECTING SCHOLASTIC ACHIEVEMENT**

Studies have shown that variations in achievement are caused by a number of factors. They can be classified broadly into psychological factors and environmental factors. Under the psychological factors may be included the cognitive abilities like intelligence and creativity, interests, motivation and personality. The environmental factors include the home and family background, socio-economic status, and attitude towards school. Some of the research evidence on the role of non-intellectual factors on academic achievement are presented in the following sections.

**INTEREST AND ACHIEVEMENT**

Not many studies have been carried out on the relationship between interest and performance in school courses. In a comprehensive study on the subject, Frankel (1960) found that the high-achievers were more interested in computational and scientific courses,
compared to the under-achievers. The under-scorers had higher scores on mechanical or artistic interest. The choice of the school subjects was closely related to the interests. The high-achievers preferred mathematics and science and found language difficult. The under-achievers, on the other hand, found mathematics to be the most difficult subject.

**Motivation and Achievement**

Motivation, in its broad sense, contributes a significant measure to academic success. Motivation may be understood from two angles, i.e., the externally induced motivation such as through verbal comments, remarks or gestures, and the internal drive which in Hullian sense would be almost like an endowed ability.

In the area of induced motivation, Page (1958) found that the children who were given free comments (both praise and blame) regarding their performance on an objective test achieved higher scores on subsequent tests than those who received 'specified comments' (wildly positive) and those who did not receive any comments. Thus, external motivation coming through
praise or blame affects school performance. However, the effect of praise and blame may not be quite as direct and simple. Corliss and Axelrod (1937) and Thompson and Hunnicutt (1944) found that the blamed extraverts performed better than the praised extraverts. The reverse was true of the introverts.

The second area of motivation, as envisaged by the terms, 'level of aspiration' and 'need for achievement ('n Ach'), has more relevance to academic attainment. Lowell (1952) found that individuals high on 'n Ach' showed higher level of performance on both arithmetic and verbal skills. Atkinson and Litwin (1966) reported a positive correlation between 'n Ach' and persistence and performance in examinations. The work of Atkinson and Feather (1966) strongly substantiated this finding. Festinger (Atkinson and Feather, 1966) showed that the level of aspiration and goal-setting were positively related to performance. Green and Farquhar (1965) found academic motivation to be positively related to academic achievement. However, Shatnagar (1969) failed to obtain a positive relationship between 'n Ach' and academic success.
PERSONALITY AND ACHIEVEMENT

As personality is the pervasive characteristic of an individual, it is but probable that it has effect on academic achievement. A number of studies have been carried out in this area, which have yielded intelligible and dependable results. Among the personality factors, anxiety was largely investigated, perhaps due to its drive properties (Taylor, 1953). However, the findings point in two opposing directions. McCandless and Casteneda (1956), Keldhusen and Clausmeir (1962) and Philips (1962) found a negative relationship between test anxiety and manifest anxiety on the one hand and academic achievement on the other. Anxiety, it seemed, had acted as a noxious drive state which the individuals tried to avoid. However, the work of Sarason (1957), Suinn (1965) and Robinson (1966) reveals that anxiety has a positive effect on academic achievement. These opposing results bespeak of either some methodological error or conceptual ambiguity. As such, this area needs more refined and extensive work to enable educationists to arrive at definite conclusions.
Eysenck's (1947; 1960) personality analysis in terms of intelligence (cognitive) and extroversion/introversion and neuroticism (affective) has generated a number of studies, attempting to relate these dimensions to academic attainment. The findings, again, are not absolutely unequivocal; however, the trend of results are more or less within the framework of expectations, based on theory. For instance, Eysenck (1947, 1960) maintains that the introverts would perform better in any task because of their quickness in cortical excitation, faster accumulation of reactive inhibition and its slower dissipation. In the sphere of academic achievement, too, this was found to be true. Lynn and Gordon (1961), Callard and Goodfellow (1962), Child (1964) and Madan (1967) found that the introverts were more successful in academic work than the extroverts, the differences and the correlations reaching some level of significance.

The neuroticism dimension is more like the anxiety level and hence has yielded a mixed trend of results. Lynn and Gordon (1961) obtained a positive relationship between neuroticism and academic attainment, as reflected
by vocabulary scores. Callard and Good fellow (1962), Savage (1962), Child (1964) and Madan (1967) on the other hand, found neurotics to be poorer than the stable, in school and college. The 'Yerkes-Dodson law' may to a great extent account for the disparity in the findings in this area (Child, 1964; Madan, 1967).

According to this law, the stables would perform better on more complex tasks because the simpler tasks coupled with low drive would not bring this type of individuals to their best performance. The reverse would be true of the neurotics.

A more recent indication is that the joint effects of extroversion-introversion and neuroticism are more dependable in making predictions about academic success than either dimension alone. The combination of introversion with stability was found to yield better performance in the English as well as the Indian sample and it was found to be true of different age levels, between 10 and 25 years (Child, 1964; Madan, 1967).

HOME-FAMILY BACKGROUND AND ACHIEVEMENT

The home and family background factors that were
investigated for their relationship with achievement.
are education and occupation of the parents. Frankel
(1963) found that the fathers of the high-achievers
had more formal education than their mothers. The
under-achievers, on the other hand, had significantly
greater number of working mothers in the lower jobs
such as typists, clerks, receptionists and the like.
Lindgren and Juedes (1963) also found that the education
of parents was positively correlated with academic
achievement of children.

Geberich (1957, administered to students of 55
Connecticut towns, the Gough Home Index - an instrument
which measures the style of life as well as income,
occupation, and education - and related it with
achievement. He found .44 correlation between achieve-
ment and home-index.

Socio-Economic Status and Achievement

Almost all the books on Educational Psychology
emphasize the relevance of the socio-economic status (S.E.S.)
of the family on the achievement of children. The upper
level of S.E.S. is generally supposed to provide for
greater facilitation in education, Lavis (1957) reported a correlation of .24 between S.E.S. and eighth-grade achievement. Frankel (1960) found his high-achievers to belong to a significantly higher level of S.E.S. Lindgren and Juedes (1963) also obtained a significant positive relationship among parent's education, social status and school marks. However, Curry (1962), using a more elaborate design, observed that the S.E.S. has relatively no effect on children with higher I.Q. The lower I.Q. group was the most affected by S.E.S. The disadvantage showed up in language, reading and total achievement and it did not affect arithmetic. Rao (1970) studied the relationship of S.E.S. among others, to scholastic achievement and obtained a significant correlation of .39 between them. In the whole, the adverse effects of S.E.S. become more severe as intelligence decreased.

School Attitudes and Achievement

Attitude towards and school and school work have also been found to be contributing to achievement. But their contribution is considerably reduced when the
effects of intelligence is held constant. Davis (1957) found that school attitudes correlated .32 with achievement; this correlation was, however, reduced to statistically insignificant level (i.e., .12) when I.Q. was held constant. Frankel (1960) observed that the underachievers were significantly more absent from school than the over-achievers. Their participation in co-curricular activities was also much less and they had a greater offence record. Jackson and Lebherz (1967) however, found no significant relationship between scholastic success and attitude towards school or satisfaction with school. Mao (1970), studying the relation of school attitudes, among others, to scholastic achievement found them correlated significantly. Thus, students who are more favourably inclined towards school and school work are more likely to have high achievement; however, they are also more likely to be the more able students.

COGNITIVE FACTORS AND ACHIEVEMENT

Of the many factors constituting the cognitive domain, psychologists have long been interested in the factor of intelligence and its relation to school achievement. It is only in the recent past that they focussed
attention in the effect of creativity on scholastic achievement.

**CONCEPT OF CREATIVITY**

Until the scientific breakthrough in the last two decades, creativity was regarded as a magic gift, a divine endowment or a chance event. It was Guilford's Presidential Address to the American Psychological Association in 1950 that focussed attention on the need to revise our conception of the human intellect so as to include in it a whole set of human potentialities that we call creativity. It includes traits such as flexibility, initiative, ingenuity, adaptability, spontaneity and originality. Ever since, there has been a phenomenal growth of research and the output on the subject virtually exploded. The enormous developments in the field have been deliberated upon in several symposia, particularly in the United States, and excellent reviews and summaries have been brought out (Stein and Heinz, 1960; Taylor and Carron, 1963; Taylor, 1964; Freeman, et al. 1968; Wallach, 1970).
The problem of creativity has been approached structurally by Guilford (1950), experimentally by Balint (1962), typologically by Stein (1963), and descriptively by Flanagan (1965).

Factor-Analytic Approach to Creativity

Using the factor-analytic technique, Guilford (1950) discovered the important factors in creative thinking to be the ability to see problems, fluency and flexibility of thinking, originality, redefinition and elaboration. His "Structure of Intellect" theory identifies five kinds of operations, four kinds of contents and six kinds of products. Altogether, the theory yields 120 unitary abilities, in terms of specific operations, contents and products. Guilford (1950; 1967) differentiated convergent and divergent thinking as different intellective modes. Convergent thinking, which is synonymous with the traditional concept of intelligence, is characterized by the narrowing down of the logical possibilities and zeroing-in on the best response. Divergent thinking, on the other hand, is essentially concerned with the generation of a variety of mental responses to a criterion.
Torrance (1962) conceived of creativity as a process of being sensitive to problems, deficiencies, gaps in knowledge and incongruities. This process also includes the reduction of tension through formulation of hypotheses, testing and retesting them, modifying them and communicating the results.

**Personality-Oriented Approaches**

MacKinnon (1962) and Barron (1955; 1963) were concerned with identifying the personality and other behavioural characteristics of creative individuals. The work of MacKinnon (1962) reveals the nature and nurture of creative talent. According to Barron (1955; 1963) originality is almost habitual with some persons. Some are regularly original, whereas others are regularly unoriginal. Hence, there is an underlying disposition toward originality which exists in those persons who are regularly original.

Maslow (1962) considers the personality of the individual to be the essence of creativity and hence
more basic to its products and achievements. He has distinguished "self-actualizing creativeness" from the "special-talent creativeness". The latter is the resultant of the possession of high degree of ability in specific fields and therefore production in such case is usually limited to such areas. The former which is the sine qua non of creativity springs from the very person himself. It manifests as the kernel of positive mental health and enables the individual to accomplish the proseic and the routine aspect of life in a flexible, creative manner. A balanced admixture of both types of creativeness reflects character-integration in the individual.

The standpoints of Goldstein (1937), May (1959), Rogers (1959) and Fromm (1959) also stress the creative personality and the need for its manifestation and realization.

**Psychodynamic Conception of Creativity**

It was Freud (1908) who gave a new orientation to the personality dimension of the creative mind. According to him, libidinal energy constitutes the
essence of creative achievement. He believed that creative individuals channelled their libidinal energy in the direction of culturally-respected goals. However, present day psycho-analysts like Kris (1953) attributed it to preconscious function, for they believed that the unconscious mind is repressive, stereotyped and inhibitory. They are of the opinion that in the preconscious, communication is improved between the id and the ego, permitting preconscious thought-development.

Contemporary work on creativity has been stimulated by psychoanalytic viewpoint. Thus, the current emphasis is on cognitive and adaptive concepts dealing with adjustment to the external world, or relatively neutralized, conflict-free spheres of ego-activity, like problem-solving and on the controlled use of more primitive psychic mechanisms which promote rather than interfere with adaptation (Guilford, 1957). In keeping with this view, Kris (1952) postulated the concept of "regression in the service of the ego". This was later elaborated by Schaffer (1958). Though regression is a sign of pathology, the creatives make it adaptive.
The popular stereotype that sometimes confuses the creative genius with the emotionally disturbed has been falsified by scientific research. There is ample evidence to testify that character-integration and emotional stability provide a necessary steady platform for the subtle awareness which makes creative functioning possible (Demos and Lowen, 1967).

S-R APPROACH TO CREATIVITY

The S-R approach to creativity is based on the principle of reinforcement and operant conditioning. This principle leads to the formulation that the extent to which a child is able to come up with creative responses will be a function of the extent to which he has been rewarded or punished for creative thinking during his childhood period. This viewpoint emphasizes the role of parents in the creative disposition of their children, through the child-rearing practices.

More recent S-R theories have stressed what they refer to as "mediating process". An illustration of one such formulation is that of Jagoood (1953). However, many psychologists reject the S-R position
which relegated the individual to a very passive level. They consider that the most interesting determinants of creativity may be found to be present in the personality of the individual (Goldstein, 1937; May, 1959; Rogers, 1959; Maslow, 1962), and not in his conditioning history.

THE COGNITIVE APPROACH TO CREATIVITY

 Unlike in the S-R orientation, intellectual functioning is considered by the cognitive theorists (Pepinskey, 1955; Witkin, et al. 1954) as a highly unified process which cannot be split into discrete fragments. Creativity is, thus, explained in terms of the characteristic ways in which people come to grips with their environment. This approach concerns itself with the extent to which highly creative people are willing to take in large amounts of information from the environment rather than to restrict to a narrow, albeit, safe, portion of it. In effect, it is contended that the creative individual is prepared to take risks in his thinking and behaviour, and is characterized by greater degree of intellectual flexibility (Cropley, 1967).
ASSOCIATIVE CONCEPTION OF CREATIVITY

Saltzman (1960) conceived of creativity as behavior that occurs relatively infrequently, is common under given conditions, and is relevant to those conditions. The experimental approach of Saltzman was pursued by Mednick (1962) who posited the associative conception of creativity. As the associative conception of creativity has been employed in the present study, a detailed description of this conception would be appropriate here.

Analysis of the introspective account of highly creative persons led Mednick (1962, p.221) to define creative thinking as ".....the forming of associative elements into new combinations which either meet specified requirements or are in someway useful". According to him, there are three conditions that facilitate creative problem-solving; they are Serendipity, Similarity and Mediation.

In explaining individual differences in creative ability, he spoke of a need for associative novelty and the existence of associative hierarchy. Creative
individuals have a constant tendency for a habit to link ideas in rather unusual ways. Speaking of the existence of associative hierarchies, Mednick (1962) made a distinction between steep and flat associative hierarchies. In steep associative hierarchies, the strength of associations between ideas vary greatly; the stronger associations are stereotyped and conventional in nature. An individual possessing a steep associative hierarchy has then a thin chance of combining ideas in unusual and unconventional ways. But the creative individuals associate ideas in novel, unusual and unconventional ways. This is characterized by a flat associative hierarchy which helps the individual to be flexible in solving a problem. Sufficient evidence for the existence of steep and flat associative hierarchies in relation to creative problem-solving has been adduced by Mednick (1962).

Following the lead given by Mednick (1962), Wallach and Kogan (1965) came to the conclusion that the creative process consists of the ability to generate under various circumstances, associational responses that are many and that are unique. They proposed a gradient theory of creativity, in which the gradient of potential responses is shallow for a less creative individual. Time and/or evaluation pressure prevent the highly creative
individual from evoking his unique or creative responses, which will be evoked only after he has produced the relatively common and stereotyped responses that all people will tend to give initially, irrespective of their potential level of creativity.

According to Wallach andogan, responses of greater stereotypy are likely to come earlier in the sequential emission of a series of associates: responses of greater uniqueness, if they come at all, are likely to occur later. This is true with respect to both shallow and steep type of slope or gradient. The implication is that the total number of associates an individual is capable of generating and the relative uniqueness of his associates, should be correlated. Secondly, under the steep gradient, associations of high stereotypy are produced at a very rapid rate, and then the ability to produce falls off abruptly. However, associations of low stereotypy will be generated at a considerably slower rate than the rate at which individuals with steep gradients produce high stereotypy responses. Hence, if short time-limits are imposed, the individual with a steep gradient may appear a star performer
because his burst of facility may take him up to the point when time is called out. This may eventuate in a misleading impression. Therefore, it is desirable that no time limits are imposed and that the individuals are allowed as much time as they require.

Wallach and Kogan (1965) found a good correlation between the fluency score and the uniqueness score in their study, and Pankove and Kogan (1968) found that the fluency scores alone would be an adequate criterion of creativity. In other words, for valid measures of creativity, it appears that one can safely rely on the measure of fluency or number without concern for uniqueness.

The Concept of Intelligence

Psychological traits can differ both in mode of functioning and in degree of generality. The most widely accepted distinction between modes of functioning, and one that seems to represent an important difference, is between traits of personality and traits of ability. The former describes how a person generally behaves, and the latter what problems he can
solve if sufficiently motivated.

With abilities, there is an inevitable tendency to see one end of the scale as high, and the other as low. Some writers try hard to avoid these tendencies, speaking of gifted children as 'super-normal deviates', but even in this jargon, 'super' still implies directionality in the scale. Assessment of abilities recognises a 'high' and a 'low' end, assessment of personality traits does so less often.

The introduction of the concept of intelligence was mainly due to the writings of Herbert Spencer (1855) and of Francis Galton (1870) in the nineteenth century and the word came into general use much later. Both believed in the importance of a general ability superordinate to and distinct from special abilities, and their views were adopted and amplified by leading neurologists around the turn of the century. E. Burt (1955) himself accepted the theory of a general cognitive capacity probably dependent upon the number, complexity of connections, and organization of the nerve cells in the cerebral cortex. This general hypothesis is
still tenable and accepted by many modern neuropsychists (e.g., Sholl, 1956).

Spearman (1904) produced extensive statistical evidence for the predominance of general ability or intelligence. Though the predominant and integrating function of general ability was stressed, the existence of more specific abilities was not denied. In 'Iles' (1957) language, 'intelligence' is not only a 'disposition word', but is also 'polyvalent and open'. 'Intelligence' is an open concept, because the number of activities legitimately characterised as indicators has never been listed. Terman (1925) conceived of intelligence as the ability to carry on abstract thinking. Woodrow (Butcher, 1968) considered intelligence to be the capacity to acquire capacity. Thorndike (1966) regarded it as the power of good responses from the point of view of truth or fact. Thurstone (1924) concluded that intelligence could be described as the capacity to live a trial-and-error existence with alternatives that are as yet only incomplete conduct.

**CLASSIFICATIONS OF DEFINITIONS**

There are many different views of intelligence
advanced by different psychologists. Some psychologists have attempted to group them into categories. Vernon (1961), for instance, classified descriptions of intelligence as biological, psychological, or operational. Freeman (1962) categorizes them into those emphasizing the (a) power of adaptation to environment, (b) capacity for learning, and (c) ability for abstract thinking.

However, few definitions and points of view have contained a clear commitment about the relative effects of hereditary and environmental factors. It is Herr (1955) who is almost alone in grasping this nettle firmly and defining intelligence as "innate general cognitive ability". Since scores on existing intelligence tests have been shown to be susceptible to environmental influences, a result of this definition is that intelligence as defined differs from intelligence as measured by tests. But many scientifically-minded psychologists were uncomfortable with this differentiation since it is necessary in a science to relate the concepts directly to actual observations or measurements.
KINDS OF INTELLIGENCE

Psychologists have tried to overcome the anomaly caused by environmental influences on intelligence in one of two ways. Firstly, they have postulated different kinds of intelligence. Herrnstein (1947) and Cattell (1963) have distinguished two kinds of intelligence. Herrnstein calls them 'Intelligence A and Intelligence B', and Cattell refers to these as 'Fluid and Crystallised Intelligence'. In each case, one kind of intelligence is thought of as genetic potentiality, or the basic, given qualities of the individual's central nervous system, and the other kind as mainly the result of experience, learning and environmental factors.

OPERATIONAL MEANING APPROACH

Another way by which the anomaly was sought to be overcome was to adopt an operational definition of intelligence to parallel the procedure in other sciences. Hence, it was maintained that intelligence should be defined as "what the tests test". This has generated a raging controversy on the concept of intelligence between those who prefer to take an open-ended view of
the concept and those who insist that progress depends on defining intelligence on a purely operational level.

It is certainly advantageous to have an operational definition of intelligence so that those who are engaged in scientific research would be in a position to distinguish it from vague, popular conceptions. This has already been accomplished to a certain extent; yet there are many different tests of intelligence and many different opinions about their merits and demerits, for I.Q. to be considered a satisfactory dimension at all, comparable with corresponding yardsticks in more developed sciences. If we want to define intelligence as what is measured by an intelligence test or battery of tests, we must first agree on what test or combination of tests to accept.

RAVEN'S CONCEPTION OF INTELLIGENCE

Based on Spearman's (1923) conception of intelligence, Raven (1960) devised the Standard Progressive Matrices which is meant to measure the capacity to apprehend meaningless figures, to see the relations between them and to develop systematic method of reasoning. As the present study adopted Raven's (1960) view
of intelligence, for conceptual purposes, intelligence was regarded as the capacity to form comparisons and to reason by analogy.

CREATIVITY AND INTELLIGENCE

The relationship between creativity and intelligence is exceedingly complex and is further complicated by difficult problems of measurement. Dearborn (1938) reported that some of his more intellectual subjects were least imaginative. Creativity measures, emphasizing divergent thinking and based on the Guilford and the Torrance-type of creativity tests, correlate moderately (.25 to .30) with measures of intelligence (Guilford, 1950; Drevdahl, 1956; Torrance, 1960; Torrance, Yamamoto, Schenetzki, Palabutlu and Luther, 1960; Holland, 1961; McGuire, et al. 1961; Cline, Richards and Abe, 1962; Getzels and Jackson, 1962; Cline, Richards and Needham, 1963; Yamamoto, 1964 a, b and c). This suggests, at first thought, that the abilities comprising creativity represent a spectrum of intellectual abilities that is different from the traditional concept of intelligence. However,
investigations with the type of creativity tests mentioned above have also revealed the fact that the different component abilities of creativity correlate among themselves just as much as they do with intelligence. (Cline, Richards and Abe, 1962; Getzels and Jackson, 1962; Cline, Richards and Peedhan, 1963; Thorndike, 1963; Ohnmacht, 1966). This finding clearly indicates that they cannot be considered representative of a common attribute of creativity that is independent of intelligence.

As against these findings, Flescher (1963) and Wallach and Kogan (1965) have reported very low and negligible correlations between intelligence and creativity. However, in Flescher's study, the intercorrelations among the sub-tests of his battery were also negligible. Hence, the abilities measured by Flescher can hardly be considered representative of a unitary trait of creativity. It was Wallach and Kogan who accomplished the task of devising creativity tests such that the component tests correlated highly among themselves and at the same time had negligible correlations with measures of intelligence. Their homogeneous measures
of creativity, exhibit satisfactory generality, over component elements and hence can be considered reflective of a stable cognitive ability. Positive evidence for creativity as a cognitive ability independent of intelligence was obtained in India by Pathak (1961) and Panazesh (1971, 1972).

The relationship between intelligence and true substantive creativity turns out to be slightly different from that between intelligence and psychometric measures of creativity. The evidence clearly suggests that creative individuals in art, literature and science are more intelligent than non-creative individuals (Drevdahl and Cattell 1958, Hitt and Stock, 1965) and that individuals with I.Q. contribute much more than their share of notable and original discoveries in the various disciplines (Terman and Oden, 1956). This suggests that intelligence like other supportive cognitive traits, makes possible and implements the expression of substantive creativity (Price and Bell, 1965). In short, a certain minimal level of intelligence above the average is necessary for the actualization of one's creative potential. But above this critical level,
the relationship between intelligence and true creativity is approximately zero (Drevisahl, 1956, Ierman and Oden, 1950). This motion is referred to as the "threshold concept" which is attributed to Anerson (1960). According to this concept, there may well be an I.Q. threshold below which divergent processes cannot operate and above which they become independent. Anerson has suggested that after a cut-off point in I.Q. has been reached effective creative functioning begins to depend on factors other than mere I.Q.

Nee (1960), Mackinnon (1961), Torrance (1962), Taylor (1964), Iamamoto (1965) and unarma (1972), have determined this I.Q. threshold to be around 120.

A CASE FOR THE PRESENT STUDY

Psychologists and educationists have always been interested in the problem of the academic achievements of pupils in high schools and colleges. Many attempts have been made to unravel the determinants of academic achievement. It is not surprising to see that in psychology, intelligence had been much relied upon as an important factor influencing academic achievement.
A number of studies were conducted on the relationship between intelligence and scholastic achievement (e.g., Kemp, 1955; Rossi, et al., 1957). These studies revealed that intelligence and scholastic achievement are significantly related to each other. The findings had been so impressive that it was almost taken for granted that intelligence alone would be a sufficient predictor of educational success. However, further research has failed to provide an unequivocal support to this contention. A perusal of the findings of many studies reveals that the correlations between intelligence and academic achievement had been unstable. A number of investigators (e.g., Lindgren and Guedes, 1963; Madan, 1967) have reported correlations ranging between .20 and .60 between intelligence and achievement. The extent of these correlations fails to account for more than one quarter of the variance in achievement (Sattler and Jackson, 1962). This implies that the problem of scholastic achievement—intelligence relationship needs to be looked at afresh. In other words, it could be considered that either intelligence does not account for scholastic achievement in full or some factors other than intelligence needs to be
explored besides intelligence, to account for school success. In a sense, this has pointed to the possibility of a limited role of intelligence in academic achievement. Obviously, psychologists and educationists directed their attention to new areas of cognitive functioning and to the conative domain as well.

It is also conceivable that the level of achievement of pupils could be a function of the total context of the school including the motivations and personality make-up of the pupils, the teacher's perception of pupils' classroom behaviour, their attitude towards the pupils and the like. In other words, temperament, behaviour and attitude of pupils might contribute their own share to the achievement level of pupils. Looking at the problem of academic achievement from these two angles, viz., individual interelective ability and the personal-social traits, we are easily led into an area of cognitive ability, viz., creativity, which is also interwoven with the conative sphere.

Studies on creativity have long been neglected, in preference to intelligence. However, it is
Increasingly realized today that intelligence tests fail to tap important aspects of intellect which are signified by the term 'creativity'. Furthermore, these neglected aspects of intellect are related, among other things, to performance in classroom and are therefore of special significance to education.

The importance of creativity in education can hardly be disputed. Guilford (1966) has considered creativity to be the key to education in its fullest sense and to the solution of mankind's serious problems. Indeed, inventive and original minds created civilization and added glamour and lustre to history. It had been aptly pointed out by Toynbee (1964, p.4) that "to give a fair chance to potential creativity is a matter of life and death for a society". Hence, scientific and systematic attempts at elucidating the problem of the effect of creativity on scholastic achievement are very much needed. The present effort is but one attempt in that direction.

Attempts at elucidating the relationship between creativity and academic achievement had been fairly numerous in America, but the findings tend to be
contradictory. In some investigations (Geertz and Jackson, 1959, 1962; Torrance, 1959; 1960; 1962; Gropley, 1966, 1967; Hassan and Butcher, 1966; Wallach and Wing, 1967), it was found that creativity and achievement were significantly correlated.

In most of these studies, the instruments which were used to assess creativity were not such as to tap an empirically valid dimension of creativity that was conceptually different from the traditional concept of intelligence. Thorndike (1949) and Wallach and Kogan (1965), who made a reanalysis of the data have concluded that there was little warrant in those studies for conceptualizing a general cognitive dimension of creativity, that is like the concept of general intelligence, but independent of the latter.

Most of the investigations used Guilford or Torrance-type of tests for determining creativity. Hence, the effect of creativity on achievement that was found in these studies could be attributed to the variance the creativity measures shared in common with the convergent measures. However, this criticism
cannot be leveled against the findings of Wallach andัย (1967).

If we employ creativity instruments that are able to assess empirically the conceptually distinguishable domain of creativity, we can expect this variable to have no relationship with academic achievement, since the determination of achievement that is usually employed is a predominantly convergent process. This is precisely what other investigators like Klescher (1963), Wallach and Logan (1965), Parmelee (1973), Starr and Micholl (1975) did obtain. They found no significant relationship between creativity and achievement. This finding is understandable in that the creativity measures employed in these studies were empirically independent of intelligence measures.

As against these findings, Edwards and Tyler (1965) found that a high intelligence group of ninth graders was superior to high creativity group on both achievement test scores and grade-point average. The negative relationship that was found between creativity and achievement in their study may be explained in the context of the observations of Getzels and Jackson (1962).
fac.innon (1962), and others that the creative students tend to be non-conforming and hence are frequently disliked by their teachers.

STUDENT B: THE RIDDLE

In the context of the conflicting results and equivocal findings on the problem of creativity-achievement relationship, the present study was undertaken to explore and elucidate the nature of the effect creativity has on academic achievement. However, researches on creativity have shown intelligence to be a confounding variable and is, therefore to be accounted for and controlled. Hence, the present study attempted to investigate the scholastic achievement of pupils in relation to their cognitive abilities, viz., creativity and intelligence.

Studies adopting the associative conception of creativity and employing a valid measure of it based on that orientation to assess the role of creativity in academic achievement are not many, particularly so in India. Hence employing as it does the Wallach-Kogan creativity instruments, which are the most satisfactory
to the instrument of creativity based on the associative conception, the present study endeavours to study scholastic achievement as it is affected by creativity and intelligence.

OBJECTIVES OF THE STUDY

The criterion of achievement employed in schools is usually the marks obtained by pupils in the traditional type of examinations held in the school. Though marks represent the index of achievement that is in practical use, yet it cannot be wholly relied upon as the criterion of achievement, since it is probable that subjective considerations creep in in the evaluation done at the school.

It was, therefore, thought desirable to have a measure of school achievement in terms of scores on achievement test, in addition to marks. Hence, a dual criteria of achievement is employed in the present study, viz., marks in the school examination and scores on achievement test, in the subjects of English, Mathematics and Science. It was also considered useful to examine the nature and the relative difficulty of
In three subjects included in the investigation, in terms of the dual criteria employed. This will enable us to have an insight into the actual experience of the pupils and the difficulties faced by them in these subjects. The Wallach-Hogan Battery of Creativity Instruments (1965) was employed to obtain a measure of creativity and the Raven's Standard Progressive Matrices (1963) was made use of for assessing intelligence.

The objectives of the study are:

(1) To examine the effects of creativity and intelligence on scholastic achievement as measured by marks in the school examination.

(2) To examine the effects of creativity and intelligence on scholastic achievement as assessed by performance in achievement tests, specifically constructed for the purpose.

(3) To examine the nature and relative difficulty of the school subjects in terms of the relative achievement in them, as indicated by school examination marks.
To examine the nature and relative difficulty of the school subjects in terms of the relative achievement in them, as indicated by performance in achievement tests on the subjects.