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Abstract

This study was carried out in six preparatory schools in the city of El-Fayoum in Egypt. The sample of the study comprised 230 boys and girls who were in their second year of preparatory school (middle school), and 100 teachers.

The main purpose of this study was to examine the relationship between creativity and the locus of control. The research was also concerned with: (a) the relationship between creativity and intelligence; (b) the relationship between intelligence and the locus of control; (c) sex differences in both creativity and the locus of control; (d) the concept of the ideal pupil as held by the group of teachers.

Creativity was measured by a creativity inventory and by the teachers' ratings of students' creative performance in Arabic and drawing.

The following tests were given to the students: (1) the GIFFI I creativity inventory; (2) the Nowicki-Strickland locus of control scale; (3) the Pictorial Intelligence test. The teachers were requested to answer the following questionnaires: (1) the Ideal Pupil Check-list; (2) the creativity rating scale. The pilot study showed that these instruments were valid for use in this research.

Five hypotheses were examined in the research. These were concerned with the relationships between creativity and internal locus of control, creativity and intelligence, and internal control and intelligence; and also with sex differences in creativity and locus of control, and Egyptian teachers' concept of the ideal pupil.

The results confirmed the first and the fifth of these hypotheses. The other hypotheses were rejected by the data. These findings are in line with previous results relating to these areas of research. The findings of the present research are explained in the light of creative personality theory and in the light of socio-cultural factors which influence the development of creative behaviour. Finally, suggestions are made which may, it is hoped, help schools in Egypt to develop internal orientation and creativity in their pupils.

Dedication

To My Parents

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Chapter One

Introduction

Research into creativity has since the 1950s been increasing, as a consequence of the growing awareness of educationists, psychologists and leaders in different fields of life concerning the importance of developing people's creative behaviour. This increase is evident in the large number of published research projects, articles, tests, and books on the subject. Two main approaches have been used to investigate creativity. The first of these has focused on identifying and measuring those mental abilities which are thought to be conducive to creativity. The second approach has concerned itself with the relationship between creativity and personality factors. Despite this weight of research, however, many problems still remain regarding the definition of the concept of creativity and the establishment of valid criteria which can be employed for its assessment.

The problem of defining creativity becomes particularly acute when one is dealing with children's creative potential. Adults' achievements can be evaluated in the light of accepted criteria such as originality and usefulness. Establishing a valid criterion for measuring children's creativity, however, is a far more difficult task. Researchers have attempted to solve this problem by using various methods, such as tests of creative thinking, teachers' and peers' nominations of creative children, creativity ratings, and personality tests. There are, however, problems regarding the validity of many of the existing criteria of children's creativity. For example, Guilford's and Torrance's tests of creative abilities have run into criticism from psychologists. Thus Vernon (1980) criticized these tests on the grounds that they were not measuring a valid concept of creativity. Also, along with their inherent difficulties of administration and scoring, creativity tests failed to predict

creative behaviour in real life situations.

The present research employed a method for measuring children's creativity which was carefully selected and examined before use, as described in Chapter Seven below. This was achieved by adopting the Personality Characteristics approach. Based on this approach, the Group Inventory For Finding Interests (GIFFI I) was developed by Rimm and Davis (1980). This inventory was employed in this research. It includes the following scales: (1) creative writing and arts; (2) challenge - inventiveness; (3) confidence; (4) imagination; (5) many interests; and (6) the total score. Davis and Rimm (1977) report that

> educators and other professionals are attending to personological or non-cognitive contributors to creativeness with correspondingly less emphasis on the 'cognitive' capabilities. By personological traits we primarily refer to the individual's personality, including his/her attitudes, interests, values, motivation, awareness, habits and other 'dispositions', which along with some biographical features lead very regularly to innovative thinking and doing.
>
> (p.546)

Along with the students' scores on the creativity inventory GIFFI I, teachers' ratings of the students' creativity in Arabic and in drawing were used as a criterion for determining creativity. Careful attention was paid to ensuring the validity of these measurements.

The value of the Personality Characteristics approach has also been earlier emphasized by Golann (1963), who reported that

> the use of theoretically derived personality factors as criterion variable has, because of its own inherent difficulties, been neglected, yet holds most promise of providing a functional developmental understanding of creativity.
>
> (p.548)

Studies reviewed which had dealt with creative adults, e.g. Barron (1963a,1963b,1969), Mackinnon (1962), Drevdahl and Cattell (1958), Roe (1953a,1953b,1961) and Bergum (1975) indicated that

creative adults were self-confident, independent in thinking and judgement, autonomous, internally oriented in their evaluations, spontaneous, and original in their thinking. In fact there is a great body of research which supports the existence of such traits in creative adults who were selected on the basis of actual creative products.

In the case of potentially creative children, however, only a small number of studies have been carried out with the aim of examining their personality characteristics. The general picture to be derived from such studies as those of Weisberg and Springer (1961), Hetrick et al. (1968), Eissenmann and Robinson (1967), Torrance (1970), Dauw (1966) and Milgram and Milgram (1976b) shows these children as possessing the following characteristics: strength of self-image; perceptiveness; preference for complexity; originality; perception of themselves as creative; and intelligence. Potentially creative children in these studies were identified on the basis of test scores. The findings of the above studies reveal a similarity between the personality characteristics of creative adults and those of creative children. It is very difficult, however, to make a direct comparison between the results obtained in the two areas of research, adults and children, or even between those obtained in each individual area, because of the multiplicity of creativity criteria and personality variables used in the studies.

The nature of the creative personality to be investigated has engaged the attention of many psychologists, who in turn give different views concerning this issue. The two major approaches towards the study of the creative personality are those presented in psychoanalytic theory and humanistic theory. An example of the

conceptualization of the creative personality within the psychoanalytic tradition is that of Freud (1938), who saw creativity as a sublimation of the libidinal energy in socially accepted activity. According to Freud, sublimation means the channelling of unacceptable instinctual desires into socially acceptable activites. Freud felt that human civilization, with all its social, artistic, and technological achievements, was essentially the result of this sublimation, or rechannelling, of primitive instinctual energies. In his analysis of the artist's personality, Freud (1920)(1) postulates that

> the artist is an introvert who is not far from being a neurotic. He is impelled by two powerful instinctive needs. He wants to achieve honour, power, riches, fame and the love of women. But he lacks the means of achieving these satisfactions. So, like any other unsatisfied person, he turns away from reality, and transfers all his interests, his libido, too, in the elaboration of his imaginary wishes, all of which might easily point the way to neurosis ... Apparently their constitutions the artist's are strongly endowed with an ability to sublimize and to shift the suppression determining their conflicts.
>
> (p.135)

This explanation of artistic creativity represents the basic framework upon which Freud interpreted the phenomenon of creativity in general. According to psychoanalytic theorists few people possess the creative ability.

Thus it can be said that classical psychoanalysis presents constructs, e.g. sublimation, which are difficult to operationalize. This is due to the fact that much of the theory deals with assumed unconscious processes which the individual cannot describe or report directly and with unconscious drives which are rarely expressed directly. The theory has been rich as a source of hypotheses for psychology, but its elaboration in some respects has lacked scientific

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(1) Cited in Vernon, 1980.

rigour. Freud's dependence upon instinct formulations and the great importance he attached to sex as a source of motivation have been strongly criticized by subsequent theorists. As to the creative personality, the theory offered the concept of sublimation, which cannot be measured since it deals with unconscious mental process.

The humanist psychologists believe that creativity is an innate potential of all human beings. Rogers (1951; 1959a; 1959b; 1961), a well-known humanistic psychologist, emphasizes that humans are capable of development, evolution, and self-actualization. Motivation of creativity, according to Rogers (1959b), emerges from man's tendency to self-actualization. By self-actualization he means

> the directional trend which is evident in all organic and human life - the urge to expand, extend, develop, mature, the tendency to express and activate all the capacities of the organism, to the extent that such activation enhances the organism or the self.
>
> (p.72)

Self-actualization, as defined by Rogers, includes not only the satisfaction of biological needs and the learning for skills necessary for physical and social survival, but also development towards autonomy, independence, and a growing sense of self-determination. Self-actualization is Rogers' motivational construct, the single goal towards which all people strive. Rogers' theory, however, allows for the description of individual differences only in very general terms and allows only for a few variables. The theory assumes for everyone a strong, inborn, positive motivation which will make for creative behaviour and freedom from serious internal conflict, but which is inhibited by non-constructive experiences. The measurement of this motivation is extremely difficult to achieve because the motivation has been formulated only in very general terms and therefore can be viewed differently by different people.

Rotter (1954; 1955; 1966; 1967; 1971a,b) and Rotter, Chance and Phares (1972) attempt to systematize the study of personality.

Compared with the psychoanalysis theory and the humanistic theory Rotter's theory is relatively well systematized. This theory, which is concerned with learned social behaviour and only to a lesser extent with notions of instinctual drive, makes the following assumptions:

(1) That one should focus attention both on the person and on the environment. This does not just mean the whole context of personal experience; it means trying to observe and ascertain how each person deals selectively with his experience;

(2) That people make something of their experiences, which form a unity;

(3) That social learning theory is not solely concerned either with broad general traits or with specific details. It employs both the general and the specific features of human behaviour, and seeks to represent human behaviour as a mixture of both the situationally specific and the dispositional;

(4) That human behaviour is motivated and that the motivation and its effect can be ascertained by the subsequent direction of behaviour;

(5) That expectancy or anticipation becomes of prime importance in that people learn to expect that specific behaviour will lead to a certain goal - in other words, that cumulative cognitive and affective experience will play a vital part in motivation and in success or failure.

One of the basic notions of Rotter's theory is that people vary in the view they take of themselves as determiners of situations. But in attributing causes, the theory locates causes of behaviour as much in the visible contingencies of the situation as in the unconscious elements within the individual. Clearly, persons who believe or expect

that they can control their own destinies (internal control) will behave differently, in many situations, than will those who expect that their outcomes are controlled by other people or determined by luck (external control). Rotter (1966) defines the internal versus external control of reinforcement thus:

> an event regarded by some persons as a reward or reinforcement may be differently perceived and related to by others. One of the determinants for this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behaviour or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions ... a perception of causal relationship need not be all or none but can vary in degree. When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his own action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labelled this a belief in external control. If the person perceives that the event is contingent upon his relatively permanent characteristics we have termed this a belief in internal control.
>
> (p.2)

It should be noted that a person's perception does not fall into an internal-external dichotomy, but rather somewhere along the complete internal-external continuum. There is an accumulation of empirical work which gives clear evidence in support of the overall hypothesis of Rotter's that an individual who believes he controls his own destiny is likely to be:

(a) more aware of environmental cues which provide him with information for his own use;

(b) more concerned to improve his environmental circumstances;

(c) more concerned with his own ability, especially his failures, and with placing high value on skill and reinforcement of achievement;

(d) more resistant to attempts to influence him;

(e) more motivated for achievement;

(f) more adjusted;

(g) more capable of striving for long-term goals and delaying gratification;

(h) more perceptive, curious, and efficient in assimilating information (Lefcourt, 1982); Phares,1976a,b).

The literature in the areas of creativity and the locus of control shows that there are similarities between personality characteristics of creative people and those of internal control people. These similarities seem to suggest a relationship between the two constructs. Therefore, the I-E control dimension may offer adequate grounds for explaining the underlying personality structure of creative individuals. In other words, creative functioning can be predicted according to the degree to which a person can perceive his or her own internal or personal control. Moreover, it is probable that creativity requires a perceptual framework which suggests a measurable degree of influence or control over one's environment. Finally, it would appear that creativity represents an actualization of autonomy, and that the creative person would be less inclined toward the acceptance of external agents as determining his behaviour.

As is clear from the above, personality characteristics of creative adults have been intensively studied. Altogether less attention, however, has been given to the personality traits of potentially creative children, and very little, in particular, to such children's locus of control. The following investigations have examined the relationship between creativity and the I-E control in children: Tetenbaum and Houtz (1978); MacGregor (1964); Churchill (1976); Cohen and Oden (1974); DuCette, Wolk, and Friedman (1972);

Lotsof and Steinke (1973); and Poole, Williams and Lett (1977). (1). In general, the findings of these studies showed a relationship between creativity and internal orientation. However, creative children in these studies were selected on the basis of one criterion alone, paper-and-pencil creativity tests. Also, the first two studies involved samples of highly intelligent children. The major purpose of the present research was, therefore, to investigate the relationship between creativity and the I-E control in a group of Egyptian school children who were chosen on the basis of their creative performance in school subjects and their scores on a creativity inventory.

Along with examining the relationship between creativity and the locus of control, the present research is also concerned with studying the following:

(a) The relationship between creativity and intelligence.

(b) The relationship between intelligence and the locus of control.

(c) Sex differences in both creativity and the locus of control.

(d) The concept of the ideal pupil as held by a group of Egyptian teachers.

Since it is a new area of research in Egyptian schools, sex differences according to both creativity and the I-E control construct are to be examined closely in the present study. Egyptian educators will provide appropriate educational experiences according to the results of such research. Another new topic covered by this research is the examination of a group of Egyptian teachers with regard to their concept of the ideal pupil. It is hoped that this examination will reveal those teachers' attitudes towards the characteristics of creative students. Needless to say, it is very important to know what such attitudes are, since their impact upon students' creative growth

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(1) Cited in Beck, 1979.

cannot be denied. Also, seeing that teachers represent vital agents in developing creativity, the present group of teachers were asked to rate this ability in their students. The aim here was to employ teachers' experiences to assess students' creativity, in the hopes that Egyptian schools might begin to benefit from this procedure. Finally, students' intelligence was measured in order to examine its relationship with creativity and with the I-E control. This investigation was carried out partly in order to establish the possible relationship between the two variables in this group of children, and partly in an attempt to see if the I-E construct is independent of intelligence or not and to validate the construct within a different cultural context.

The sample surveyed in the present research includes 230 preparatory school children (110 boys and 120 girls) and 100 teachers in El-Fayoum City in Egypt. Children join the preparatory school at the age of thirteen after spending six years in the primary school. This educational stage consists of three years. All schools are state schools (see Appendix VIII). The distribution of pupils in schools depends both upon the marks they obtain in the final examination of the primary school, which is held at the age of twelve, and upon the possible distance of desirable schools from pupils' place of residence.

Preparatory school children study Arabic, religion, a foreign language (English or French), mathematics, social subjects, drawing, music, handicrafts, and physical training. At the end of the first and the second years students are examined, and they have to pass in order to go on the following year. The final examination at the end of the third year is very important because its result determines the kind of

secondary school they will join (general or technical). Most of the students try hard to obtain high marks in this examination so that they can go to the general secondary school. Students who succeed in finding a place at the general secondary school, which they attend for three years, can go on to university. Students' choice of university faculty is determined by their scores in the general secondary certificate and by what fields of study interest them. Those students who get lower marks in the final examination go to technical secondary schools (agricultural, industrial, and commercial) where they study for three years, and after qualification they join the labour market.

Since the Egyptian revolution of 23 July 1952 education at all stages, including the university, has become free. This policy has contributed to educating huge numbers of people and has brought about better standards of living. Also, its implementation was a turning point for the establishing of sound and strong bases upon which democracy could be developed and a well-trained work-force created. The challenge which currently faces Egyptian educational authorities, however, is to provide good education for the increasing numbers of students.

Egyptian educationists are aware of the difficulties they face in developing a sound education system. Professor El Koussy (1979), for example, has written:

> Some of the outstanding hindrances are limited financial resources for the construction of suitable buildings with the required facilities, as well as the appointment of needed teachers. Another obstruction is the population growth and their crowding in such a way that does not allow for the existence of necessary space required for essential services. The growth of the general awareness of the need for education, and, therefore, the demand for it,

> is another factor. What is more, it appears that although the necessary policies, plans, and goals are formulated on highly efficient levels, the execution and performance are not carried out with the same degree of efficiency and in all cases, an apparent gap between planning and performance is clear ... A strong resistance to change is prevailing for it seems people have become accustomed to the existing patterns which in turn have become an indispensable part of their daily life ... Our pupils are brought up on superficial, veneering selfishness and committing things to memory without comprehension, instead of being brought up as individuals ... sociable and creative. We complain that despite the small percentage of the educated compared to the entire population, the labour market in its higher stratum is unable to absorb the graduates, whether on quantitative, qualitative, or assorted lines. All this in addition to the scarcity in the middle labour market of professional labourers ... All these are different examples of the existing imbalance. This imbalance persists despite the fact that its problems have been examined and looked upside-down to such an extent that we felt we are going in circles, examining and re-examining the same problems using the same technique over and over again.
>
> (p.45)

Most of the problems El Koussy mentions were prevalent in the 1970s, due to the influence of many social and economic factors that characterized that period of Egypt's development.

The two major problems regarding education in Egypt, however, are financing and planning. As a matter of fact, both resulted from the heavy expenditure on military equipment and personnel carried out during the wars between Egypt and Israel. There were no fewer than four wars in a period of twenty-five years, and in these wars the Egyptian army had repeatedly to carry out missions to protect the country's borders from Israeli invasions†. The peace settlement between the two countries in 1979 has helped Egypt to give more consideration to the country's domestic affairs, education among them. Compared with the past few years, the contemporary situation in general, and the educational in particular, is much better. Attention is extensively and progressively being drawn to the importance of planning for the

† The recent Egyptian policy towards the achievement of peace, which is based upon justice, in the Middle East is gaining international support. We hope that this support will lead to a comprehensive solution to the case.

exploitation of the Egyptian resources, human skills being the most significant of them. There is a clear realization that change for the better is made possible by valid planning, employing all resources, using modern technology, and devoting greater efforts and persistence towards achieving the goals.

Egypt, as it attempts to achieve more progress, needs creative people who are capable of solving its problems. Thus, developing creative ability in students should be considered an essential goal for the Egyptian educational system to strive towards. Potentially creative children can be detected by using multi-criteria involving intellectual tests, personality inventories, and performance in school subjects. Students who are discovered by such procedures should be given special attention by the responsible authorities so that they can develop their abilities to the full. Authorities should find the most suitable methods for developing students' gifts, taking into consideration available resources. Such methods as curricula enrichment, application of valid programmes for enhancing students' originality, the carrying out of activities in the summer holiday, under the supervision of educational administrations, which can be useful for students and the environment, and the designating of special classes for highly gifted students can all be helpful for this purpose.

Research findings, e.g. those of Wallach and Kogan (1965), Hudson (1966), Trezise (1966), Razik (1966), Kurtzman (1967), Cocha (1971), Karlims (1972), Willings (1980), Gardner (1983) and Tannenbaum (1983), have shown that creative students are intelligent, able to handle complexity, prefer complexity to simple stimuli, are resistant to premature closure, are perceptive and able to withhold opinions, and

have wide cultural interests. They are also self-controlled, self-confident, adventurous, dominant, tolerant to new ideas, possess high aspirations towards achieving creative social change, and want to understand themselves and others. Thus, potentially creative students are found to have particular characteristics in both the cognitive and the affective domains which are different from those of less creative students.

The creative teacher is not necessarily the person who actually enables children to be creative through transmitting to them his own skills. Rather, he is the one who helps his pupils to express their own innate creativity. An inferior teacher may in his own creative enthusiasm tend to dominate a child, or at least influence him in his work. A teacher, on the other hand, who can detect a gift in a child and encourage him to develop it may watch a child create in a way he himself is quite incapable of doing. His sympathy and insight will do more to help the child than his own creative talent. The teacher who can put the needs of the child before his own frees the child to express himself. On the other hand, the teacher who views the work of the child in terms of the credit it will bring him, or who uses the work of the child to express his own ideas, seeks satisfaction for himself, and the child is bound by his dominance. Children who are free to follow their natural exploration of materials frequently startle the adult with the primitive reality of their results. The teacher who can accept the crude nature of the child's work is accepting a stage in the development of that child's creative expression. Thus, the teacher who helps the child to develop his creative ability is in fact helping him in his whole development.

It should be stated that creativity should not be seen as

something different and separate from personality. The creative person is creative in his whole approach to life. His characteristics are not just discrete attributes that the creative person happens to have; they are his creativity as it reveals itself in the business of everyday living. When it comes, therefore, to discussing how best teachers can encourage creativity in children, we say they can do so by helping children to develop towards maturity and self-actualization. Rogers (1957; 1961) stresses that a favourable attitude towards children and empathic understanding are, along with other personal qualities, the most important contribution the teacher can make towards fostering creativity in children, and to these he adds freedom from external evaluation. This means that although the teacher is free to react to children's creative work, he should refrain from passing categorical judgements upon it, since by its very nature divergent activity contains no immutable rules of correctness.

Torrance (1962; 1965a) has given considerable attention to the problems that gifted children face as a result of their conflicting interaction with the environment. The creative energizing forces that dominate the life of the highly creative child set him in a position of independence and nonconformity in relation to the group of which he is a member, often leading to confrontation of one kind or another which requires that he either learns to cope with arising tensions, with consequent productive behaviour and sound mental health, or that he represses his creative needs, with consequent personality disturbances and breakdown. Torrance suggests coping strategies which can help children to face such problems. Most of these problems are thought of by many prominent thinkers, e.g. Gretzels and Jackson (1962), and Barron (1963a), as culture-bound and arising from the

negative attitudes of society towards creatively gifted people.

The influence of the environment upon the development of people's creativity is an important factor which should be considered at the same time as attempts are being made to facilitate and encourage students' creativity. In Egyptian schools, the educational process needs to be carefully planned so that students are given adequate opportunities to develop their creative talents. According to some scientists, the average person realizes during his or her lifetime only five to fifteen per cent of his or her potential. The late Fritz Perls, the Gestalt psychologist, said that to the degree that we have a fixed rote set of responses, to that same degree the conditioning that many of our schools impose upon us limits our potential to a sliver or fraction of what it would be; whereas to the degree that we can be spontaneous, reacting to the moment, can consider open-ended ideas of complexity and depth and can conceptualize abstract ideas (a system of knowledge rather than memorizable facts), to that extent we have much more of our potential available. We need more questions and fewer answers in our classrooms for the gifted. Mar'i (1976) maintains:

> Only after we have determined the environmental, cultural, and social conditions that block the creative potential of individuals, and other conditions that are conducive to the development of these talents, can we achieve the universal goal of modern education: the development of the learners' creative talent.
>
> (p.108)

In the present research, the results obtained by the Egyptian students on the creativity inventory were compared with similar findings for American and Australian students. In addition, the responses of the Egyptian teachers on the ideal pupil check-list were compared with those of American teachers. It is hoped that this comparison may be

useful in furthering an understanding of creativity and of the various types of research in this connection. Comparing results obtained from different cultures is important as a means of establishing a more valid concept of creative behaviour.

The following instruments were used in the present research:

(1) The Group Inventory For Finding Interests (Rimm and Davis, 1980).

(2) The Nowicki-Strickland locus of control test (Phares, 1976a).

(3) The Pictorial Intelligence test (Saleh, 1978).

(4) The Ideal Pupil check-list (Torrance, 1965).

(5) Teachers' Ratings of Students' Creativity Scale.

The following hypotheses were examined in the present research:

(1) That there would be a significant relationship between creativity, as measured by the creativity inventory and the teachers' ratings, and the internal locus of control, as measured by the Nowicki-Strickland test;

(2) That there would be significant sex differences on the creativity measures, the creativity inventory and the teachers' ratings, and on the I-E scores as measured by the Nowicki-Strickland test;

(3) That there would be a significant relationship between intelligence, as measured by the Pictorial Intelligence test, and creativity, as measured by the creativity inventory and the teachers' ratings;

(4) That there would be a significant correlation between the internal locus of control, as measured by the Nowicki-Strickland test, and intelligence, as measured by the Pictorial Intelligence test;

(5) That the concept of the ideal pupil held by the present group of Egyptian teachers (as measured by the Ideal Pupil check-list) would not be consistent with that of experts on the creative personality.

The originality of this research lies in two main areas. First, it attempts to identify some cognitive and affective characteristics of creative Egyptian students. In this connection, it aims at specifying an appropriate procedure for identifying creative students in Egyptian schools. Secondly, this research aims at specifying certain cultural factors which influence creative development in Egyptian schools. Research in these two areas may, in turn, shed light on the capabilities of Egyptian school students and on the usefulness of them for the Egyptian community. At the same time it is hoped that the results may contribute to a deeper understanding of the traits of creative pupils in a universal sense. Creativity, in any event, is not confined to one group of human beings.

Chapter Two

Historical Development of the Notion of Creativity

Introduction:

The purpose of this chapter is to present a number of theories and approaches which have attempted to interpret creativity. Doing this may serve to explain how the concept of creativity has been developed. The approaches discussed here represent significant theoretical positions in this area. The discussion includes a survey of how creativity could be evaluated, and may therefore help to establish an appropriate criterion for measuring creativity in our own sample of Egyptian middle-school children.

The following approaches are under consideration:

(1) The Biographical Approach to Creativity

(2) The Psychoanalytic Approach to Creativity

(3) The Humanistic Approach to Creativity

(4) The Gestalt Approach to Creativity

(5) The Behaviouristic Approach to Creativity

(6) The Personal Attribute Theory of Creativity

(1) The Biographical Approach to Creativity

The term 'genius' was one of the oldest concepts which was used to distinguish people who had superior talent and who achieved original works. Historically speaking, the term was used in Greek times, and it has been used ever since. For instance, it was employed in the eighteenth century to describe that faculty which enables a person to achieve original contribution in the arts or sciences. For example, Gerard (1774) defines the concept thus:

> Genius is properly the faculty of invention, by means of which a man is qualified for making new discoveries, or for producing original works of art.
>
> (p.8)

Subsequently, in the nineteenth century, the concept of genius was widened by researchers who carried out biographical studies in an attempt to investigate the nature of genius and who also sought to analyse the thought processes which had led to exceptional achievements. The research of Galton, Hereditary Genius (1869) represented the first scientific attempt to investigate human ability. Galton's aim was to link genetic factors and genius using the pedigrees method. The term 'genius' was applied to people who had attained distinction in a variety of different areas of endeavour, e.g. literature, sport, politics, music, and research. Galton referred to three significant factors in genius. These factors were ability, zeal and the capacity for hard work. He did not accept that inspiration or abnormal mental conditions constituted genius:

> If genius means a sense of inspiration, or of rushes of ideas from apparently supernatural sources, or of an inordinate and burning desire to accomplish any particular end, it is perilously near to the voices heard by the insane, to their delirious tendencies or to their monomanias. It cannot in such cases be a faculty nor can it be desirable to perpetuate it by inheritance.
>
> (p.x)

One of the main contributions of Galton's study was the notion of genius as being a capacity which lies at the far end of a continuum distribution of abilities. In fact this notion brought him recognition as the founder of the theory of individual differences in psychology. However, Galton's work has been criticized for neglecting the impact of environmental aspects upon the development of genius. Hollingworth (1927), for instance, criticized this approach in stating that

> these studies of which Galton's study is one clearly show many inherent defects of material and method. In the first place, eminence and superior mental ability are not identical. We may certainly agree with Cattell that what a person can do depends on his congenital equipment, but we must also agree that we do not, from studies of eminent adults, know how far what he actually does do depends on his environment.
>
> (p.14)

Galton's research, nevertheless, stimulated a stream of research with the same purpose of understanding the nature of genius. Among such studies is that of Cox (1926), who employed what was, with some modifications, a histometric approach. According to this approach the achievements of eminent people were evaluated in the light of mental tests for each mental age. By doing this the intelligence quotients were estimated. Cox's sample involved 300 eminent men born between 1450 and 1850. The analysis showed that the estimated IQs ranged from 100 to 200, with a mean of 155. Selecting 100 persons, Cox also examined the personality traits of this group by analysing their life history. Having regard to this issue, two psychologists were asked to rate these subjects as regarded a number of cognitive, emotional, and moral traits which were exhibited in their behaviour in childhood. This method employed a seven-point rating scale. The results showed that these subjects were very high in all the rated traits. They were especially superior in the traits of ambition, perseverance, deep involvement in tasks, depth of perception and originality.

The research of Ellis, Study of British Genius (1904) utilized biographical information of 975 eminent men and 55 eminent women, who were selected from some 30,000 people. There were up till this time two trends in the conceptualization of genius. The first trend considered genius as a normal ability. Galton's approach represented this direction. The second trend assumed that genius was fundamentally

a pathological condition and closely related to insanity. The theory of Lombroso (1891), which associated genius and insanity, represented this direction. Lombroso (1891) claimed the following:

> Between the physiology of the man of genius ... and the pathology of the insane, there are many points of coincidence; there is even actual continuity. This fact explains the frequent occurrence of madmen of genius, and men of genius who have become insane, having, it is true, characteristics special to themselves, but capable of being resolved into exaggerations of those of genius pure and simple. The frequency of delusions in their multiform characters of degenerative characteristics, of the loss of effectivity, of heredity, more particularly in the children, of inebriate, imbecile, idiotic, or epileptic parents, and, above all, the peculiarity of inspiration, show that genius is a degenerative psychosis of the epileptoid group.
>
> (p.359)

Lombroso (ibid.) also stressed the notion of a relationship between genius and insanity:

> This supposition is confirmed by the frequency of a temporary manifestation of genius in the insane, and by the new group mattoids to whom disease gives all the semblance of genius, without its substance.
>
> (p.359)

In fact, Lombroso's notion was based upon inadequate selection of the sample.

Ellis's (1904) data did not support either of the two above-mentioned views, Galton's or Lombroso's:

> It can scarcely be said that the course of our investigation ... has led to either of these conclusions. On the one hand we have found along various lines the marked prevalence of conditions which can hardly be said to be consonant with a normal degree of health or the normal condition of vitality; on the other hand, it cannot be said that we have seen any ground to infer that there is any general connection between genius and insanity, or that genius tends to proceed from families in which insanity is prevalent ... We cannot, therefore, regard genius either as a purely healthy variation occurring within normal limits, not yet as a radically pathological

> condition, not even as an alternation - a sort of allotropic form of insanity.
>
> (pp.226-7)

Ellis believed that genius should be regarded as a highly sensitive and complexly developed adjustment of the nervous system along special lines, with a concomitant tendency for the system to be defective along other lines. Its elaborate organization along special lines is often built up on a basis even less highly organized than that of the ordinary average man. Ellis concluded:

> We may perhaps accept the ancient dictum of Aristotle as reported by Seneca: 'No great genius without some mixture of insanity.' But we have to remember that the 'insanity' is not more than a mixture and it must be a finely tempered mixture.
>
> (p.230)

The biographical approach was also used with the purpose of investigating the creative process. This involved the analysis of the thought processes as they were presented in creative people's accounts regarding their accomplishments. The contribution of this kind of study was the formulation of stages of the creative process. Such analysis can be helpful for those seeking to understand the characteristics of creative thinking, and would be important for developing creative potential in children.

Wallas (1926), through analysis of accounts of their thought processes written by creative people such as Poincare and Helmholtz, identified four stages in the creative process. These stages were: preparation, incubation, illumination and verification. Preparation includes the statement and definition of the problem and the gathering of the relevant material. Incubation is characterized by a relative inactivity, but the functioning of the deep level of the mind (the unconscious) is still trying to solve the problem. Illumination is the stage at which the discovery or solution happens, and is often

accompanied by strong emotion. Finally comes verification, wherein the creative person evaluates and confirms his discovery or solution.

Wallas (1926) writes,

> If we examine a single achievement of thought we can distinguish four stages - Preparation, Incubation, Illumination (and its accompaniments), and Verification. At the preparation stage we can consciously accumulate knowledge, divide up by logical rules the field of inquiry, and adopt a definite 'problem attitude'. In Verification we can consciously follow out rules like those used in Preparation. At the Incubation we can consciously arrange, either to think on other subjects than the proposed problem, or to rest from any form of conscious thought. This second form of Incubation is often necessary for the severer types of intellectual production, which could be hindered either by continuous passive reading. If we are consciously to control the Illumination stage we must include the 'fringe-conscious' psychological events which precede and accompany the 'flash' of Illumination and which may be called Intimation.
>
> (pp.10-11)

This suggested model of the stages of creativity formulated by Wallas encouraged researchers, e.g. Rossman (1931), Kneller (1965), Patrick (1955) and Mackinnon (1970) to examine the idea further. The analyses contained in these studies involved the essential elements of Wallas's conceptualization. Wallas's model has, however, been criticized as being static and rigid in its description of the creative process. Butcher (1972), for example, states:

> These first stages provide a scheme that, although inadequate, is about the best we can do to summarise the aspects of the creative process common to scientific and artistic work. The names of the stages are largely self-explanatory, even if they vaguely describe, rather than account in detail, for the actual phenomena.
>
> (p.122)

Also, Wallas's model was believed by Davis (1973) to be consistent only with science, and did not, he felt, adequately explain the creative stages operative in the arts. To Davis, those steps identified by Wallas corresponded closely to steps in scientific

method which include statement of the problem, hypotheses formulation, planning and conduct of research, and evaluation of the results. Regarding the verification stage, Butcher (1972), too, saw that the similarities between scientific and artistic creativity are much less clear than Wallas had imagined. A very significant difference is that scientific theory is directed by logical thinking and expected to be examined empirically.

Another problem associated with the stages of Wallas is the definition both of incubation and inspiration, since these by definition

> are unobservable mental events ... The precise mechanics of incubation and inspiration are rather difficult to isolate, since we could be faced with studying phenomena of which, by definition, we cannot even be aware!
>
> (Davis, 1973, p.16)

Because of such obstacles psychologists of problem-solving have eliminated the concept of incubation from their analyses. These psychologists, e.g. Davis (1973), use operational definitions in their descriptions of problem-solving steps. These steps consist of perception of a problem, definition of the problem, the searching for clues, the trying of solutions, the acceptance of a solution and the testing of the solution.

Guilford (1950) disagrees with the notion of analysing the creative process into stages:

> Such an analysis is very superficial from the psychological point of view. It is more dramatic than it is suggestive of testable hypotheses. It tells us almost nothing about the mental operations that actually occur. The concepts do not lead to test ideas.
>
> (p.451)

The concept of incubation was also criticized by Guilford on the grounds that we cannot measure the degree of incubation in individuals. He writes:

> The belief that the process of incubation is carried on in a region of the mind called the unconscious is of no help. It merely chases the problem out of sight and thereby the chaser feels excused from the necessity of continuing the chase further.
>
> (ibid., p.450)

What is very important according to this view is the identification of the mental operations which take place during the creative process. Such operations can help to explain individual differences in creative performance.

The present researcher believes that an objective model of creativity should include only the mental processes which can be subjected to measurement. It should also be mentioned that present models do not adequately consider the discovery of the problem. An accurate model should therefore include detailed indications concerning this aspect, because the kind of problem determines the nature of the mental activities, creative or otherwise, needed for the solution.

The concept of stages in creativity, if employed inadequately, can lead researchers to try to discover only these stages in their examinations of the creativity process. Thus, they may neglect important aspects in this process because they direct their attention only to confirming such stages. Significant elements in creativity could therefore be left without careful observation. Understanding complex behaviour such as creativity necessitates deep perception and comprehensive understanding. Numerous variables affect creativity, therefore it is of no help conducting research while having predetermined convictions. Real understanding of psychological and social conditions affecting creative behaviour contributes to formulating accurate concepts regarding this phenomenon.

It appears that there are methodological problems bound up with the biographical approach. These are as follows: Data collection requires retrospective thinking, in the sense that it is only after the occurrence of the creative idea that creative people are supposed, by means of techniques such as interviews, questionnaires and reports, to tell us about their creativity. Also, the reliability of data is often doubtful and the data does not fit with specific purposes. The method involved in this approach can also lead to the selection of biased samples of creative processes, simply because it focuses on achieved products and therefore does not take into account unfulfilled creative processes. Looking into variables that hampered such processes may also be necessary in the understanding of creativity. Finally, this approach is of no use in studying the creative potential of children because they are not able to achieve actual creative products.

(2) The Psychoanalytic Approach to Creativity

Freud (1938, 1947b) proposed three systems in the mind: the 'id', the 'ego', and the 'super-ego'. Freud claimed that, at birth, the mind consists only of the 'id'. The id contains everything psychological that we inherit, a fixed amount of mental or 'psychic' energy. This energy is in the form of instincts, i.e. of irrational drives whose only aim is to seek gratification for the individual's basic, animalistic needs. As the id remains the only source of psychic energy throughout life man can never free himself entirely from its power. The id is the primitive side of man. The id links him, through the long chain of his evolutionary history, with the base forms of life from which he has arisen. Since the id is entirely unconscious, we are

never directly aware of it, but it is always there, seeking the satisfaction of its powerful needs. Beneath the reach of consciousness, and of ethical and rational thought, the id can never be other than a blind, unsocialized, amoral force. Left unbridled, its drive towards selfish satisfaction would reduce human behaviour to that of the beasts.

Freud considered that the instincts within the id fall into two groups, eros instincts and thanatos instincts. The eros instincts are the life-wish, and consist both of those drives directed towards self-preservation (flight, hunger, thirst, etc.) and of those directed towards preservation of the species (the sex drive, or libido). The thanatos instincts are the death-wish, and take the form of aggression, directed both outwards towards others, and inwards towards the self. Freud referred to the instinctive drives of the id as primary processes, while the selfish objectives of these drives he termed the pleasure principle. During the first year or so of life, the child is entirely dominated by the primary processes and by the pleasure principle. He lives only for the satisfaction of his primitive needs, and is unconcerned about the well-being or the wishes of other people. The child gradually comes to realize that not all his (instantly gratified) needs are exactly in tune with reality. In consequence, in a process which Freud never fully succeeded in explaining, part of the id begins to learn a more rational way of looking at things, and gradually separates itself off from the rest of the id to form what Freud called the ego. From the second year of life onwards, the ego becomes an increasingly important part of the child's mental functioning. It serves as the mediator between the needs of the id and the restrictions which reality places upon the gratification of

these needs. Unlike the id, therefore, which obeys the pleasure principle, the ego obeys the reality principle. It contains all the child's rational thinking, his sense of self, and all his conscious thoughts. By means of the ego, the child becomes more of a person and less of an animal.

Freud called ego processes secondary processes to distinguish them from the primary processes of the id. Because these secondary processes prove successful in mediating with the outside world, and in seeing to it that the id's needs are satisfied wherever possible, the id allows the ego to siphon off more and more of its energy, until soon the ego has a surplus which it can turn to more creative pursuits such as the development of general interests and skills. However, the id always remains ready to cut off the flow of energy to the ego and to re-assert itself should the latter fail in its primary task of satisfying the id's needs. To Freud, the diversion of energy from the id to the ego is the major dynamic event of personality development. It is not, however, the final event. From the age of about six onwards, part of the child's ego separates itself off in turn and becomes the third system of the mind, the super-ego.

One of the ways in which the ego learns about reality is by identifying itself with other people, particularly with parents. In the process of this identification, the child takes over many of the moral precepts of the adults in his life. But these moral precepts often owe far more to the beliefs and prejudices of these adults than they do to reality, and therefore they cannot be accommodated within the ego itself, which obeys only the reality principle. A section of the ego therefore has to break away to deal with them, and this becomes what Freud called the super-ego.

The super-ego is a very important concept in Freud's theory. The child gets his ideas of his own moral worth largely from what people tell him about himself. Freud would claim that the super-ego provides us with a model of the mechanics of all this. Since the super-ego is created in response to the code of restrictions, admonishments, and moral precepts that the parents impose upon the child, it also requires parental powers of reward and punishment. It rewards by the feelings of pride that the child gets when he obeys its promptings and strives towards the ideal self that it holds up as a model in front of him, and it punishes by the pang of conscience that he feels when he disobeys them.

The contents of the super-ego are part conscious, but mainly unconscious. Thus most of the super-ego, like the id, lies beyond the range of rational thought. The child is saddled with many of his parents' beliefs, and finds it difficult, even as he grows older, to take these out and submit them to rational scrutiny and debate. Thus he often behaves in certain ways because he considers them to be 'right', but is unable to give a reasoned, objective argument as to why they are right. If the super-ego contains too many of these irrational beliefs, and becomes as Freud put it 'over-developed', it can cause almost as many personality problems to the individual as can an unchecked id. However, a normal, well balanced super-ego is an essential part of the socialization of the child, and the essential repository of a moral sense in us all.

By the time a child reaches the middle year in infant school, the three personality systems of id, ego, and super-ego are therefore in existence. For the personality to remain healthy, Freud considered it vital that these three systems remain in balance, with a smooth

transfer of energy from id to ego to super-ego. Where the balance is disturbed, and where one of the systems dominates the others and uses up more than its fair share of this energy, the result is that the personality breaks down into excessive anxiety.

Freud saw normal development as taking place when the id, the ego, and the super-ego are in a state of balance, and when the ego defence mechanisms, i.e. repression, projection, rationalization, reaction formation and regression, are being steadily replaced by more mature and efficient ways of dealing with one's problems. As normal development progresses, the individual also outgrows excessive dependence upon the primitive primary processes of the id, and learns to displace the energy associated with these processes into the socially acceptable secondary processes of the ego. This displacement, according to Freud, explains all the interests, attitudes, and aspirations of the mature personality.

Freud (1910; 1924; 1947a) was the first to suggest clearly a dynamic theory of the creative act. He was probably the first to undertake serious work on man's ability to create. For Freud, the process of sublimation provided the energy for all cultural accomplishments, including creativity. Imaginative creation was asserted, as was day-dreaming, to be a continuation and substitute for childhood play. Creative production was seen as the result of unconscious conflicts of drives and needs sublimated through the ego's effort into outcomes useful to both the creator and society. Freud's early writings generated in others a continuing interest in artistic creativity, largely as a result of his studies of poets, artists, and writers. Sublimation was seen as the basic process by which sexual energy was transformed into socially acceptable forms. Creativity was

also seen as a substitute for the achieving of satisfaction and thus as a means of avoiding the hardship of reality. The creative individual turns from reality to fantasy, where he gives full play to his erotic wishes. If successful, he models his fantasies into a new reality which becomes creative. Creative behaviour is, then, an overt manifestation of sublimation, an unconscious process through which libidinal or aggressive energies are converted into culturally sanctioned forms of behaviour. Since Freud also identified psychopathology as having an identical origin, a theoretical link was postulated between creativity and mental illness, although Freud did make a distinction between the two phenomena.

One additional aspect of Freud's conception of creativity was his belief that the manifest artistic formulation was a restructuring of archaic unconscious images after these had been accepted as conscious symbols and after the symbols had been reformulated within contemporary modalities. The creative process thus originated within and not outside the person, and the creation mirrors unconscious imagery after it has been processed through the ego.

The Freudian interpretation of creativity can be summarized in the following way:

(1) Creativity has its genesis in conflict, and the unconscious forces motivating the creative solution are parallel with the unconscious forces motivating the neurotic solution;

(2) the psychic function and effect of creative behaviour is the discharge of pent-up emotion resulting from conflict taking place until a tolerable level of emotion is reached;

(3) creative thinking derives from the elaboration of fantasies and from day-dreaming and childhood play;

(4) when the unconscious processes become ego-synotic creative achievement occurs;

(5) creative production is seen as a continuation and substitute for the play of childhood.

Some psychoanalytic theorists have deviated from the traditional Freudian stream. For example, Jung (1959; 1971) believes that the 'projection' is the mechanism responsible for creativity. Jung divides the unconscious into two types, 'personal' and 'collective'. The collective unconscious is inherited and contains experiences of antecedent generations. Jung claims that great artistic achievements come from the collective type of unconscious. According to Jung, the contents of the deeper, 'collective' level of the unconscious are personified as archetypes. These are images, common to all mankind, which reflect man's basic needs and desires, but which are essentially impersonal in that they are not derived from the child's experience of real people. Such images bear little relation to real people but easily become projected upon real people, with the result that the latter become imbued with magic, and seem to possess the fascination, the glamour and the compulsive attraction which properly belong to the archetypal image.

Thus the Jungian theory holds that archetypal images are derived from the inherited collective unconscious rather than from infantile experiences. Jung supports this notion by stating that archetypes having very similar attributes could be found in the mythical and religious inheritance of different cultures and different ages. In his studies of the arts, Jung distinguished between two modes of creative expression, psychological and visionary. Persons who actively perform on the basis of the psychological mode are considered to be totally

dependent on conscious processes; but of particular importance to Jung is the visionary mode which involves the reproduction of 'primordial experiences' or archetypes from the collective unconscious.

Another conceptualization of creativity, which deviates from the traditional Freudian concept, is that of Kris (1952). The pre-conscious is recognized by Kris to be the source of creativity. Creativity occurs through what Kris calls 'regression in the service of the ego'. This concept is in fact a progressive view, because it has helped researchers to see creative behaviour as a matter of directed and deliberate activity and not as a matter of chance and luck. Thus, creativity is regarded as being more than the unconscious diversion of libidinal energy, including as it does conscious awareness of the problem and of the need for the solution. Creative people demonstrate the ability to regress and to assume childlike naivety. At the same time they do not lose control. This sort of regression is reported by actual creative people in their accounts of creative productivity.

Kubie (1958) has also stressed the role of pre-conscious processes in creativity. In this view, the unconscious is seen as rigid and stultifying. On the other hand, the pre-conscious is seen as flexible, and therefore vital for creative thinking. According to Kubie, creativity consists in healthy and adaptive, rather than regressive, behaviour. Of the creative process he writes:

> By means of free association the psychological processes roam freely from mental highways to its subways, unhampered by conscious restrictions, gathering analogous but seemingly unrelated ideas and impressions, putting them together in varying combinations until new relationships and new patterns come into view ... Subsequently the new patterns must be subjected to a process of retrospective, conscious, self-critical scrutiny for a necessary secondary process of checking and testing.
>
> (pp.153-4)

Thus, Kubie's concept of creativity abandons the ideas of sublimation and projection and considers the role of pre-conscious processes to be significant for creative thinking.

The psychoanalytic explanation of creativity has been criticized. For instance, the concept of sublimation does not explain why the libidinal energy of some people transmits into creative acts while that of others transmits into neurosis. Also, this concept offers no explanation of how the libidinal energy is employed such that it manifests in different types of creativity, e.g. scientific or artistic.

Maslow (1959) does not accept the Freudian theory because it conceptualizes human behaviour as a continuous struggle between impulses and defences against impulses. Maslow sees the primary processes as crucial for an understanding of creativity. Considering the educational implications of the Freudian approach to creativity, Meeker (1978) points out:

> If we as educators were to accept the Freudian approach we would be hard put in education to come up with an assessment based on creative ability as an extension of neurosis. Furthermore, the whole attitude of positive acceptance of creativeness would soon be lost if we went around trying to identify creative children by assessing their neurotic tendencies.
>
> (pp.52-3)

In spite of the above-mentioned criticisms regarding the psychoanalytic approach, it is fair to say that this approach drew attention to the importance of motivational and temperamental aspects in creative behaviour. Also, the psychoanalytic school's views on the subject constituted one of the first attempts at handling it within the sphere of psychology.

(3) The Humanistic Approach to Creativity

Psychologists taking the humanistic approach see creativity as the expression of the real self and as the utilization of innate capacities for the sake of a full development of personality. Creativity in this sense is not a way of sublimating undesired wishes but a functioning of the whole man in order that he may live effectively. It is an actualization of the self, spontaneous expression, and sound perception of the self and the environment. Psychologists in this area believe that the psychoanalytic approach conceptualizes creativity from a narrow viewpoint by explaining it in terms of processes, such as sublimation, projection or compensation. In addition, from a psychoanalytic point of view creatively is seen merely as an expression of neurotic patterns.

Humanistic psychologists offer explanations of creativity which are different from those given by psychoanalysts. For example, Fromm (1959) described two types of creativity. Creativity of the first type involves the production of original achievements of various kinds, scientific or artistic. This type is conditioned by specific factors such as talent, study or practice, and also by economic and social factors. The second type of creativity, according to Fromm, is that called 'creative attitude' or a 'character trait'. Fromm explains that

> creativity in this sense does not refer to a quality which particularly gifted persons or artists could achieve, but to an attitude which every human being should and can achieve.
>
> (p.54)

This latter kind of creativity is of particular interest to Fromm. A creative attitude is a necessary precondition of any creativity of the first type, and can exist even if there is no creative act. The creative attitude requires the following conditions: 'the capacity to

be puzzled'; 'the ability to concentrate', 'the sense of self', 'the ability to accept conflict and tension resulting from polarity, rather than to avoid them'; and 'the willingness to be born every day'.

Rogers (1959a,b) is another humanistic psychologist whose theory is based upon the realization and development of the self. Creativity in this view is an expression of a healthy and full-functioning personality. Creativity is viewed by Rogers (1959b) as being of two types. In the first of these, there must be a novel accomplishment in the world of phenomena, e.g. sculpture, industry, dancing rhythms, scientific or artistic theory. The creation of novel achievements is seen as a result of an effective interaction between the individual and the environment. For Rogers there is no difference in the fundamental bases of creativity in any area of human experience. To put it another way, Rogers considers creativity to be qualitatively the same whether shown in a soup produced by a housewife or in a theory carried out by a scientist.

Creative motivation, for Rogers, emerges from man's tendency to actualize himself and to fulfil his potentialities. This is his second type. Rogers defines this actualization tendency as the inherent tendency of the individual to develop all his capacities in ways which seem to maintain or enhance the organism. Self-actualizing creativity is the most important type from Rogers' point of view. His theory emphasizes the importance of creativity for mental health and stresses that the tendency towards self-actualization is the primary and significant motive for creative behaviour.

Maslow (1959) is another humanistic psychologist who distinguishes between special talent, creativity and self-actualizing creativity. On the one hand, special talent creativity is associated

with productivity and based upon secondary processes. On the other, self-actualizing creativity is related to personality and based upon primary processes. Again, the self-actualizing creativity is more important than special talent creativity from Maslow's theoretical position. According to Maslow (1959):

> Self-actualizing creativeness sprang much more directly from the personality which showed itself widely in the ordinary affairs of life, and which showed itself not only in great and obvious products but also in many other ways, in a certain kind of humour, a tendency to do anything creatively.
>
> (p.85)

Maslow also stresses this concept in another work, where he writes:

> the creativeness of the self-actualized man seems rather to be akin to the naive and universal creativeness of unspoiled children. It seems to be a more fundamental characteristic of common human nature ... a potentiality given to all human beings at birth.
>
> (1954, p.86)

Maslow outlines some characteristics of self-actualized persons. These people, for instance, are spontaneous, expressive, natural. They are characterized by their integrated personality and self-acceptance. Maslow's theory regards self-actualizing creativity to be concomitant with integration of personality and synonymous with health itself. Maslow (1959) speaks of another concept, the 'peak experience', which expresses the highest degree of self-actualization. An essential aspect of the 'peak experience' is

> integration within the person and therefore between the person and the world. In these states of being, the person becomes unified, for the time being, splits, polarities, and dissociation within him tend to be resolved, the civil war within is neither won nor lost but transcended. In such a state, the person becomes far more open to experience and far more spontaneous and fully functioning.
>
> (p.89)

May (1959) distinguishes between 'talent' and 'creativity'. May's

'creativity' stresses one of the creative attributes of self-actualized people, the one that Maslow calls the 'peak experience'. According to this view, creativity is an act involving a mystical experience, a state of heightened consciousness, 'engagement with reality', and 'joy'. For May, 'talent' includes 'originality', musical ability and so forth; these capacities may well have their neurological correlates, and can be studied as having been 'given' to a person.

From the discussion above of the concept of creativity in the theories of Fromm, Rogers, Maslow and May, it may be seen that in each of these theories there are two types of creativity. The first type is creativity in the sense of original productivity. The second type, which is more important to these psychologists, is creativity as a feature of integrative personality. For these theorists, creativity is an ability which all people possess. They consider the effect of environmental factors to be important because such factors can either encourage or discourage people from behaving creatively. In contrast with the Freudians, these theorists regard the unconscious as being also the source of man's potentialities, which lead to creative, constructive behaviour. In other words, the humanistic theorists, like the Freudians, look at the unconscious as containing both constructive and destructive components of human nature. What makes them different from the Freudians is their belief in man's ability to achieve sound personality development and to utilize effectively the constructive components of his nature. In connection with this issue, Anderson (1959) writes:

> Giving Freud full acclaim for originating the concept of

> the unconscious and discovering the dynamics does not mean that we should expect the examination of the concept to stop with Freud ... we need to revise his hypotheses and assumptions in order to make the assumptions consistent with positive concepts about creativity and with the world as we see it today. Instead of assuming that death, hostility, hate, aggression and destruction are instinctive, it is more consistent to assume that the basic, primary things in the universe are directional: love, life, growth, harmony, evolution, and progressing integration with the cosmos ... The most valid assumptions that concern living things are evolution, differentiation, integration, creativity, and a flowing originality.
>
> (p.244)

Although these psychologists taking the humanistic approach have offered some interesting ideas in their attempts to explain creativity, their concepts of creativity are not so clear and seem to be loosely defined. Moreover, their concepts of creativity are very difficult to measure because they are difficult to operationalize.

(4) The Gestalt Approach to Creativity

The Gestalt psychologists (Dunker, 1926; Kohler, 1929; Koffka, 1935; Wertheimer, 1945) defined productive thinking (or creativity) as an action that produces a new idea or insight through imagination, rather than through reason or logic. For example, Wertheimer's (1945) central thesis is that productive thinking requires a restructuring of the problem. He argues:

> The thinking process does not proceed by either the piecemeal operations of logic or the piecemeal connections of associationism but by the structuring of Gestalten.
>
> (p.84)

According to Wertheimer, the structural features and requirements of a problem set up stresses and tensions in the thinker. When these stresses are followed up, they lead the thinker in directions which both reduce the stresses and change the thinker's perception of the problem. Restructuring of this type occurs until a solution emerges.

The following are some of the principles that govern productive thinking:

(1) gaps, trouble-regions and disturbances should be viewed and dealt with structurally;

(2) the problem solver should consider how these disturbances related to the situation as a whole and to its various parts;

(3) operations of structural grouping, segregation, and centring should occur;

(4) central and peripheral features of the problem must be separated;

(5) structural rather than piecemeal truth should be looked for.

Thus, creative thinking is described by Wertheimer as occurring in a field which becomes focal but not isolated. This occurrence is followed by the mind taking a deeper structural view of the field, resulting in changes in functional meaning, grouping, and organizing until gaps in a problem are resolved. This involves a process of closure in which a field is restructured in order that harmony can be restored and equilibrium obtained. It is not a piecemeal operation, but rather one in which each step is subsumed or affected by the whole situation.

More recent holistic investigators are Schachtel (1959) and Arnheim (1947, 1954). Schachtel's theoretical system combines elements of psychoanalysis, humanism, and cognitive approaches. Schachtel related creativity to two stages: autocentricity, the self-centred stage of the infant; and allocentricity, the object-centred stage of the mature person. Autocentricity involves a mode of perception with minimal differentiation. A child reaches the stage of allocentricity when he can experience objects independent of his underlying wishes and fears. This openness to the object world is a prerequisite for

creativity. His allocentric encounters may alternate between global attention ,in which the object is perceived as a whole, and selective attention, in which the various facets of the whole are actively grasped. Openness is a key organizing concept in Schachtel's approach to creativity, but the openness is to the outer, rather than to the inner, experiences, although object exploration is intrinsically motivated. For Arnheim (1947; 1954), originality involves getting back to the origin, to the roots of one's experience, to the way it smells, tastes, and feels. Arnheim (1947) stated that perceptual preference for balance, symmetry, and dynamic richness are expressed in creative art forms. A creative contribution, then, is made through simplification, preference for balanced, regular, symmetrical patterns, and enrichment of the structure.

The major emphasis in this approach is that the structural features of a problem ultimately determine the restructuring process that leads to a solution. This view is primarily applicable to convergent problems, which have only one or a few right answers. It is less applicable to divergent problems, which have many possible solutions.

(5) The Behaviouristic Approach to Creativity

The stimulus-response psychologists have attempted to explain creativity within their theoretical conception of human behaviour. This framework assumes that human behaviour is essentially a matter of establishing links or associations between stimuli and responses. Creative behaviour is interpreted by these psychologists on the same bases (Cropley, 1967).

Mednick (1962) puts forward a theory in which he explains

creativity in associative terms. Creative people are supposed to establish original and useful associations stimuli. Thus the creative process is defined by Mednick (1962) as

> the forming of associative elements into new combinations which either meet specific requirements or are in some way useful.
>
> (p.220)

The more remote these elements, the more creative the process. In this theory, there are three factors which account for individual differences in creativity. These are: the 'need for associative elements'; 'associative hierarchy'; and 'the number of associations'.

Firstly, the 'need for associative elements' means that the degree to which people possess associative elements varies. Individuals who lack such elements cannot produce creative solutions. Secondly, the 'associative hierarchy' shows that people again differ in their organization of responses hierarchy and incidence of possessed associations. This organization affects the probability and speed of achieving creative solutions. An example might be the distribution of associative strengths regarding a certain idea. Two people may be asked to give responses which they associate with the word 'table'. The first person, whose responses are relatively ordinary e.g. 'chair', may have an associative hierarchy with a steep slope (see Figure 1). The second person, whose associative hierarchy is characterized by a relatively flat slope, is expected to give numerous associative responses, and is more likely than the first to produce remote associations or creative responses.

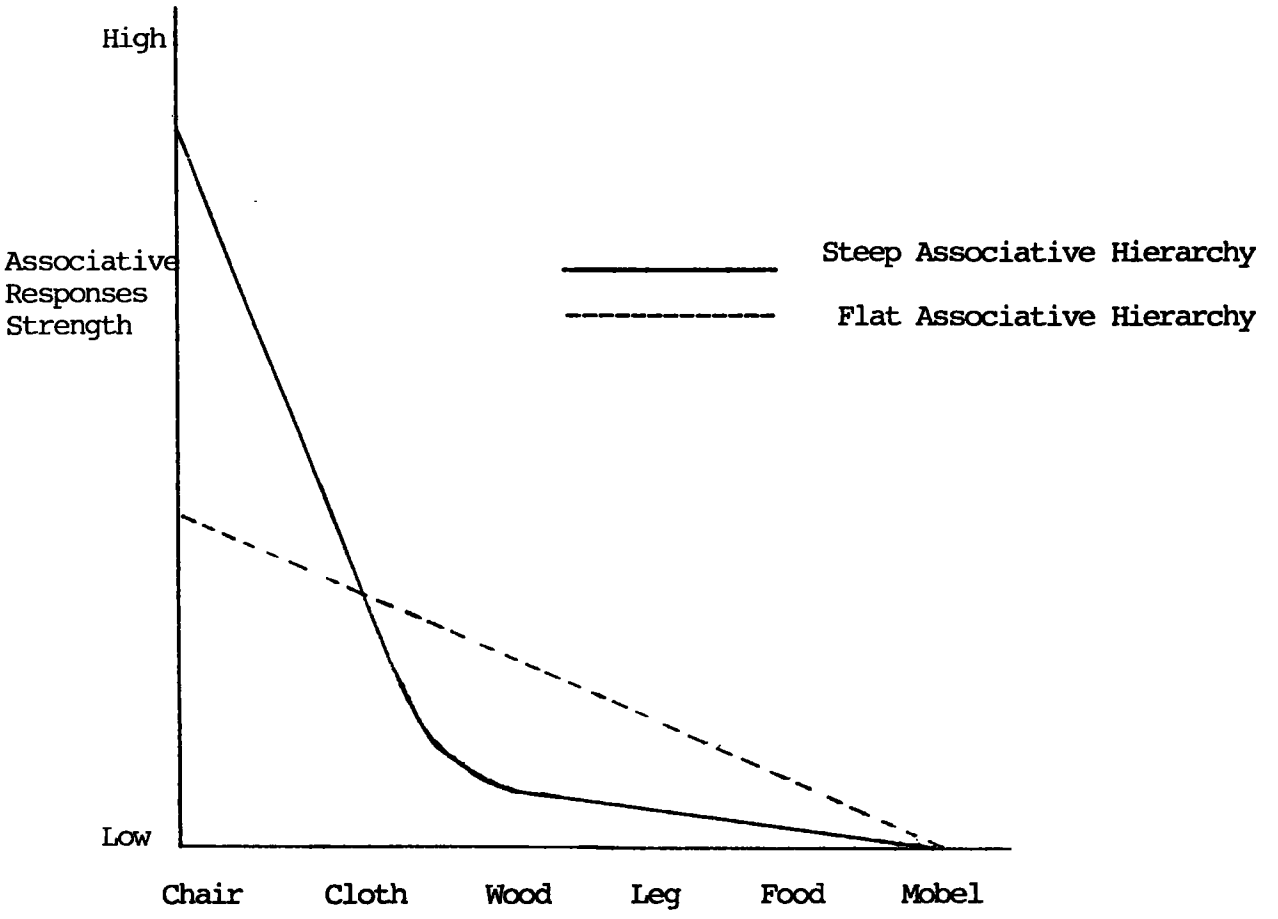

Figure 1: Associative Hierarchies around the word 'Table'.

From Mednick, 1962

From Figure 1, it can be predicted that the flatter the hierarchy of an individual, the more likely it is that he may attain the word which is very remote from the word 'table', i.e. the original response. Also, a remote association or a creative response would not be expected from a person whose associative strengths concentrate around a few associative elements. Finally, the number of associations must be numerically sufficient to solve the requisite element of the

problem. Such sufficiency greatly increases the likelihood of a solution being found, although Mednick did not believe that the speed with which it would be found would be thereby affected. Mednick maintains that it may take a good deal of time to get to the mediating links.

The Remote Associates Test (Mednick 1962; Houston and Mednick, 1963) has been developed on associative bases in order to measure creative or divergent thinking. This test involves 30 items, each of which contains three words. The respondent is required to find a word which can combine the three words. The time allowed for answering the test is 40 minutes. Validity data for this test as a criterion of creative thinking were presented by the designer. However, both the RAT and the associative theory have been subjected to criticism by a number of researchers. Cropley (1966) and Riegel et al. (1966), for instance, saw that Mednick's concept of creativity and his test were inadequate.

The inadequacy of the S-R theory in explaining creativity was also referred to by Guilford (1959), who states:

> In large part this deficiency on the part of psychology may be attributed to the general adoption of its stimulus-response model. There is no questioning of the advances that psychology has made with this conceptual model. But when we came to the higher thought processes, particularly to problems of creative thinking, the limitations of the model become very apparent. In approaching the problems it becomes more important than elsewhere to develop concepts pertaining to what goes on within the organism. We are forced to draw inferences regarding these events from what we can observe in terms of stimuli and responses, but we can no longer describe these events adequately in terms of stimulus-response concepts, or even in terms of intervening-variable concepts of Hullian types.
>
> (pp.143-4)

On these grounds, Guilford (1957; 1962) has developed a model of mental abilities which conceptualizes creative thinking as an ability that depends upon previously known primary abilities, and also upon what he terms divergent abilities. A large number of studies have been conducted in the area of creativity using Guilford's conceptualization. These studies have confirmed many of his ideas.

(6) The Personal Attribute Theory of Creativity

It is almost a century now since scientists began their efforts to conceptualize the human mind. Two schools of thought have been established in this field of research. The British school, as examplified by such scientists as Galton, Spearman, Pearson, Burt and Vernon, has regarded the general factor of intelligence as the outstandingly significant factor responsible for individual differences in intelligence. The American school, for instance such scientists as Woodworth, Thurston and Guilford, has given more importance to specific abilities, while not denying the existence of the general factor of intelligence. However, there is rapprochement between the two schools of thought. Butcher (1972) writes:

> Since the earliest days of testing and statistical analysis on intelligence, the relative importance of the two kinds of ability (general ability and specific abilities) has been hotly disputed. There was prolonged technical dispute about the extent of correlation or overlap between various abilities and about whether the statistical evidence pointed in the direction of one important factor of general ability or whether other major factors were indicated, supplementing or supplanting it. This particular controversy ... has now died down, and it is widely accepted that the question cannot be answered by statistical means alone. Many alternative classifications are possible, but in most of these general intelligence emerges implicitly or explicitly as an important and pervasive factor.
>
> (p.16)

Research carried out in the area of creative thinking was mainly initiated as a result of the emphasis Guilford (1959) placed on the need for a proper concept of creativity and its measurement. In his Presidential Address to the American Psychological Association, Guilford (1950) indicated that existing conventional tests of intelligence were only tapping convergent thinking ability and thus creative abilities were neglected in such tests.

In his model of intelligence, 'Structure-of-Intellect', Guilford (1959) employs three-way classification of human abilities according to content, operation, and product (see Figure 2). Guilford's model presents five forms of operations, four types of content, and six products. The total number of expected abilities in this model is 120. By cognition is meant recognition based primarily on perceptual skills. Memory is based on rote learning. Convergent Thinking involves a high level of thinking, but one which still centres on the right answers. Evaluative Thinking involves the making of a judgement. It is the fifth kind of intelligence, Divergent Thinking, which is emphasized in this research. Divergent Thinking involves the solving of problems for which there is no well-known right answer.

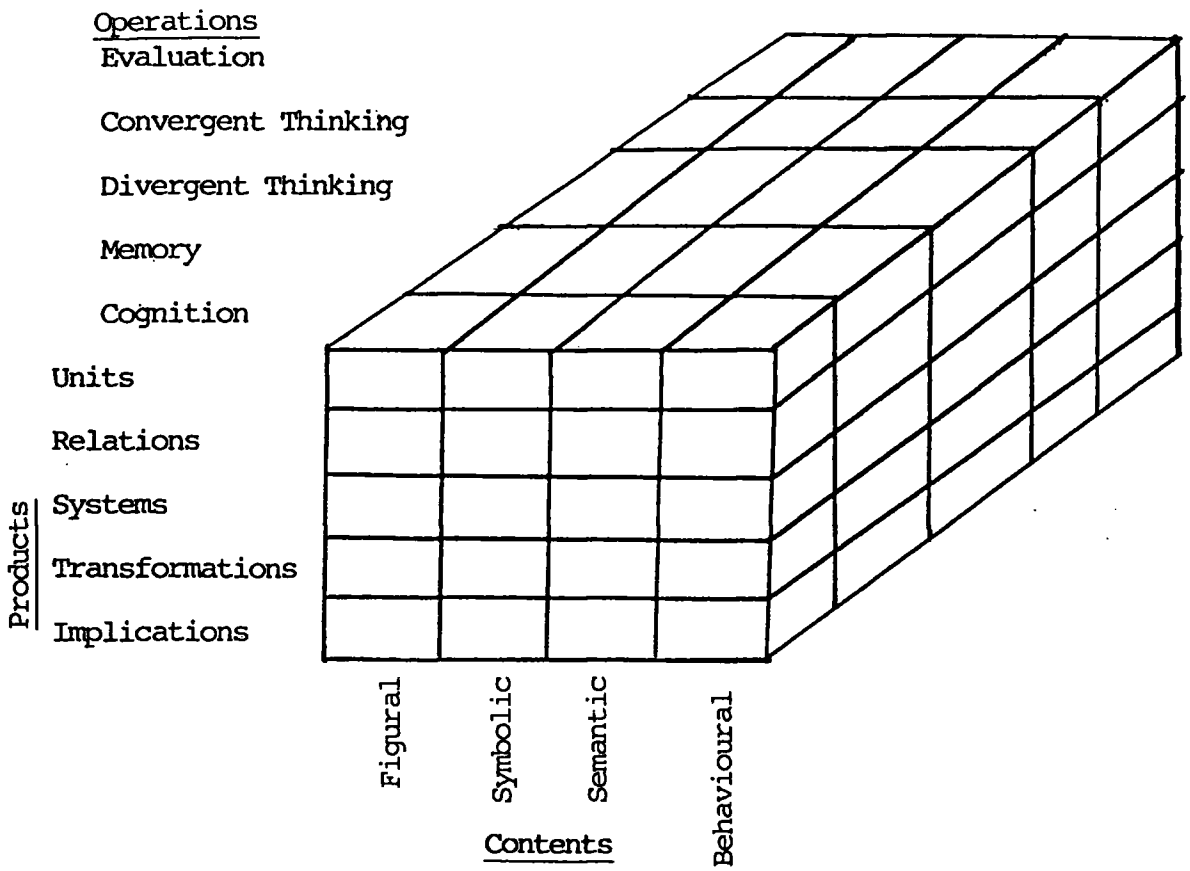

Figure 2: Theoretical Model for the Complete Structure of Intellect.

From Guilford, 1959

Guilford (1959) views creativity as an aptitude composed of a particular cluster from among the primary clusters which make up his theoretical structure of the intellect. The creative aptitude is therefore defined as consisting of such traits as fluency, flexibility, originality, redefinition abilities, and elaboration. Guilford (1950) in another context stressed the point that the possession of these traits or abilities does not guarantee that creative achievement will ensue. With regard to this point, Guilford (1950) states:

> Creative abilities determine whether the individual has the power to exhibit creative behaviour to a noteworthy

> degree. Whether or not the individual who has the requisite abilities will actually produce results of a creative nature will depend upon his motivational and temperamental traits.
>
> (p.451)

The pioneering efforts of Guilford have inspired much of the experimental work that has taken place on creativity. For instance, research into the differences between convergent and divergent thinking has greatly increased in recent years. Although this distinction had been demonstrated in the nineteenth century by a number of psychologists (cited in Burt, 1968, and Shouksmith, 1970), it became an issue of especial interest as a result of Guilford's initial conceptualization. Also, many creative thinking tests in common use today originated in Guilford's laboratory.

Torrance (1974) has carried out a number of studies on creative thinking with groups of young people using his own tests of creativity. Torrance summarizes the studies that relate to the validity of these tests. Investigators have used a variety of approaches in their attempts to establish the validity of the Torrance Tests of Creative Thinking (TTCT). Torrance has based his own arguments for validity on the studies that come within the framework of his definition of creativity

> as a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses about the deficiencies, testing and retesting these hypotheses and possibly modifying and retesting them, and finally communicating the results.
>
> (p.8)

Torrance bases his arguments for content validity on his deliberate and consistent efforts to base the test stimulus, the test task and scoring procedures on the best theory and research now available. In making decisions on the selection of his test tasks, Torrance

considered analyses of the lives of outstanding creative people, research concerning the personality of eminent creative people, the nature of performance widely regarded as creative, and research and theory concerning the functioning of the human mind. These test tasks can be administered from kindergarten up to graduate school. This makes it possible to determine whether children and young people identified as creative behave in ways similar to the ways in which eminent creative people of the past behaved when they were children and young people. It might also be possible to determine whether adults identified as creative today on the basis of outside criteria behave in creative ways on the basis of test scores. But it should be mentioned that Torrance's tests of creative thinking require a lot of time for administration and scoring. Also, the predictive ability of these tests has been criticized on the grounds of their inability to predict creative behaviour in real life situations.

Creativity research has been mainly directed to the study of the relationship between creativity and intelligence. For instance, Roe (1953a), Getzels and Jackson (1962), Torrance (1962), Mackinnon (1962), Iscoe and Pierce-Jones (1964), Cropley (1966), Hasan and Butcher (1966), Magnusson and Backteman (1978), and Hudson (1979) all suggest that intelligence is the major factor in academic achievement and closely related to creativity up to a threshold level (approximately IQ 120), beyond which creativity is independent of intelligence. The extent of the relationship between creativity and intelligence as found in such studies varied from one study to another. In general, correlations between the two variables were within the range of 0.20 to 0.40.

The second area of interest is that of the study of the

personality of creative people, as carried out by Barron (1957), Hall and Mackinnon (1969), Werner and Bachtold (1969), Schaefer (1973), and Halpin et al. (1974). Findings in this area generally indicate that creativity and personality are related factors. However, it should be mentioned that research in this area focused to a great extent on samples of adults because of the difficulties regarding the use of appropriate criteria of creativity with children.

Finally, there have been other studies which have been concerned with formulating principles and techniques that can be used for developing creative thinking, e.g. those of Osborn (1963), Parnes (1963), and Torrance (1979). The results of these studies in the area of creativity training show that it is possible, through the employment of specific methods in an appropriate atmosphere, to develop people's creative thinking. These results are encouraging and augur well for the possibility of developing this type of thinking in students.

Conclusion

This chapter has been concerned with the development of the historical notions of creativity. People with exceptional abilities have always been recognized throughout man's history. In ancient Greece, for example, such people were classified as geniuses whose inspirations were thought to be gifts from gods. Later scholars have to use scientific concepts to describe and explain such abilities. Galton (1869), for example, investigated hereditary factors in eminent people. In fact, Galton's research was the first scientific attempt to examine differences between people in terms of their mental capacities. We have classified the stream of research into six

approaches, all of which have contributed to our present understanding of creative behaviour.

Each of the approaches discussed has attempted to explain the phenomenon of creativity within its own theoretical framework. It has been shown that each approach contributed to explaining creativity in various degrees, but that none of them has offered a comprehensive interpretation of this complicated phenomenon. Efforts in this area of research should continue, in order to achieve a valid concept of creativity and its correlates which can help in predicting and developing creativity in students.

The present research may be classified as belonging to the Personal Attribute Theory of creativity. The purposes of the research are:

(a) to examine the relationship between creativity and the personality construct of the I-E control in a sample of Egyptian preparatory school children;

(b) to study the relationship between creativity and intelligence;

(c) to investigate the relationship between intelligence and the I-E construct;

(d) to examine the sex differences in creativity and the locus of control;

(e) to examine the concept of the ideal pupil as perceived by a group of Egyptian teachers.

It is hoped that the present study may contribute to the investigation of creative thinking in Egyptian schools.

Chapter Three

Creativity in Adults

Introduction

There have been many studies dealing with creativity in adults. In these studies, creativity is measured by different methods. This is because different theorists tend to use different approaches and evaluation techniques. Psychoanalytic researchers, for instance, have preferred clinical and projective techniques which are consistent with the psychoanalysis theory. The trait approach investigators have used a psychometric definition of creativity. In some of these studies, samples were selected in terms of the scores they obtained in creativity tests. Other studies have included subjects who were creative on the basis of real creative products.

Since the Renaissance, artists have been thought to contain within their personalities elements of abnormality. These elements were claimed to be necessary components for creativity. Recent research on the creative personality, however, has produced evidence to show that creative individuals (whether artists or scientists) possess healthy personalities but that they may appear different from ordinary people regarding some dimensions of personality. Such research has also indicated that these people are effective in employing their characteristics and that it is this that enables them to make original contributions. Koestler (1959) writes of creative people as follows:

> Most geniuses responsible for the major mutations in the history of thought seem to have certain features in common; on the one hand scepticism, often carried out to the point of iconoclasm, in their attitudes towards traditional ideas, axioms, and dogmas, toward everything that is taken for granted; on the other hand, an open-mindedness that verges on naive credulity toward new concepts which seem to hold out some promise to their

> instinctive groupings. Out of this combination results that crucial capacity of perceiving a familiar object, situation, problem, or collection of data, in a sudden new light or new context: of seeing a branch not as a part of a tree, but as a potential weapon or tool: of associating the fall of an apple not with its ripeness, but with the motion of the moon. The discoverer perceives relational patterns of functional analogies where nobody saw them before, as the poet perceives the image of a camel in a drifting cloud.

Koestler has accumulated a considerable body of evidence to support the view that great insights are the result of what he calls the 'bisociative process'. Creativity occurs only in minds that are prepared through saturation in the relevant fields of knowledge to see hidden relations which non-creative people cannot perceive. A creative person has to know about the old to realize the new. Hard work and practice are vitally important for outstanding creative accomplishment.

One of the earliest and certainly the most extensive studies of gifted people is that of Terman et al. (1925). One should also mention Oden (1968), whose famous longitudinal study of gifted children represents a continuation of Terman's work and is an outstanding masterpiece. A 'gifted' child in this case is defined as having an IQ greater than 140 on the Terman-Merrill Intelligence Test. In seeking out those with the highest IQs, Terman clearly believed in a linear connection between IQ and creative talent. Terman's work focused primarily on intelligence, but both his and subsequent work is especially interesting for the light it sheds on the personality characteristics both of highly intelligent and of creative people. Terman's group has been revisited periodically from the early 1920s up until recently, when Oden (1968) retested a portion of the group. She compared the childhoods of the top and bottom 100 men who she had selected by compounding professional productivity, extent of

responsibility, influence and authority over others, professional awards gained, and income. A detailed interview with each individual revealed that the top group exhibited less illness and greater stability in the home during childhood. Many more of the top group than of the others came from professional homes where parents had well-defined attitudes about education and gave positive encouragement to the children to do well at school. Learning tended to be valued for its own sake by the parents of such children. There was also in the top group a higher need to achieve during early childhood.

Guilford (1950, 1962, 1967, 1975) was concerned mainly with elucidating problems in the area of creative disposition in order to specify the traits of creative people. According to Guilford, products might be termed creative if they exhibited qualities of 'novelty'. By 'novelty' Guilford meant 'novelty within the history of the individual's behavior, and probably also within the social context' (1975, p.38). The problem of the value of products was left to technologists to determine. Creative abilities, motivational and temperamental traits were subjected to a great deal of research which aimed at investigating the contributions of these variables to the creative behaviour of adults in general.

Guilford's theory, 'Structure of Intellect', considers the human abilities so broadly that it is very difficult to look at such abilities in terms of a general ability factor as formulated in previous theories such as that of Spearman (1927, 1930). The structure-of-intellect model created by Guilford (1964) classifies human abilities on the basis of three categories: contents (figural - semantic - symbolic - behavioural), operations (evaluation - convergent production - divergent production - memory - cognition) and

products (units - classes - relations - systems - transformations - implications). According to this classification (4 contents x 5 operations x 6 products), a total of 120 mental abilities are expected to be discovered. Some ninety abilities have already been found.

Creative abilities exist within the 'divergent production' class of operations. A divergent operation refers to the process that an individual can be inferred to have employed in producing a response, although operations which Guilford calls convergence, evaluation and cognition are undoubtedly also involved in creative acts. The operation of divergent production is the most prominent, and the one which is essential for creative productivity. Thus, the most significant creative abilities lie in the divergent production category. These are fluency, flexibility, originality and elaboration. The fluency factors emphasize quantity of responses. The flexibility factors and originality emphasize the quality of performance. It should be stressed that creativity is a result both of these creative abilities and of personality factors. Persons possessing high levels of creative abilities but low levels of traits such as self-confidence, motivation, energy, independence and adjustment are not likely, according to Guilford, to employ their creative abilities to achieve creative productions.

Roe (1953a,b) and Mackinnon (1961, 1963) confirmed most of the characteristics suggested by Oden using short-term, intensive interviews of eminent and widely recognized experts from certain professions. The biographical similarities between most of these experts, particularly similarities of home background, are quite striking. For some professional groups, for instance psychologists, architects, biologists and anthropologists, it seems that a

permissive, settled, middle-class home where, however, emotional ties are somewhat strained, is the prerequisite childhood environment for them becoming creative. Mackinnon (1962) reports that the parents of creative architects, for example, had an 'extraordinary respect for the child and confidence in his ability to do what was appropriate'. Roe's method was to take a detailed life history from each individual in her sample, and to supplement this by an examination of present work, an interview, and projection and IQ tests. Exceptions to the above-noted trend are the scientists in Roe's work, particularly physicists and mathematicians, who seem to have had more share of distress in childhood. Parental separation, strict and conventional upbringing and illness were the commonest sources of distress. Roe's explanation for this exception is that scientists might be seeking to compensate for this earlier insecurity by choosing occupations which, superficially at least, involve convergent and clear-cut procedures leading to well-defined goals. This, however, is an explanation of subject choice rather than of creative talent.

Of particular interest is the summary given by Mackinnon (1962), which includes a description of the creative architect based on architects' scores on the California Psychological Inventory:

> He is dominant (Do scale); possessed of these qualities and attributes which underlie and lead to the achievement of social status (Cs); poised, spontaneous, and self-confident in personal and social interactions (Sp); though not of an especially sociable or participative temperament (low Sy); intelligent, outspoken, sharp-witted, demanding, aggressive, and self-centred; persuasive and verbally fluent, self-confident and self-assured (Sa); and relatively uninhibited in expressing his worries and complaints (low Wb). He is relatively free from conventional restraints and inhibitions (low So and Sc); not preoccupied with the impression which he makes on others and thus perhaps capable of great independence and autonomy (low Gi), and relatively ready to recognize and

> admit self-views that are unusual and unconventional. He is strongly motivated to achieve in situations in which independence in thought and action are called for (Ai). But, unlike his less creative colleagues, he is less inclined to strive for achievement in settings where conforming behavior is expected or required (Ac). In efficiency and steadiness of intellect effort (Ic), however, he does not differ from his fellow workers. Finally, he is definitely more psychologically minded (Py), more flexible (Fx), and possessed of more femininity of interests (Fe) than architects in general.
>
> (p.490)

Barron (1955, 1968) studied creativity using the same approach as Roe and Mackinnon employed, i.e. an investigation of actual creative people whose works were judged by experts to be outstanding. His studies found creative persons to be independent, inventive, autonomous and self-confident.

Cattell (1963), using a combination of detailed investigation of biographical literature together with personality measures of eminent living researchers, was able to show that the profiles of both groups were surprisingly uniform. The tendencies - and they are only tendencies, since not all eminent scientists living or dead possess exactly the following profile - are for the researchers to be more reserved, intelligent, dominant, serious, emotionally sensitive, radical and self-sufficient than the population at large. Some of these qualities add up to an introverted personality.

Also, Synder (1967) found that creative persons showed high levels of tolerance towards ambiguity. They may even enjoy dilemmas and searching out problems which have diverse possibilities. Risk-taking and adventurousness with ideas appeal to the creative mind. The work of Harvey et al. (1961) has drawn attention to a possible relationship between the level of abstraction attainable by individuals and their likelihood of producing original concepts. It has been shown that the higher the level of abstraction attainable by an individual, the more creative are his concepts.

The problem of creativity criteria, however, is a complex one. How can we assess or judge creative responses or achievements? Can we rely upon paper-and-pencil tests alone or personality inventories? Should we use real creative productions? If so, how can we measure creative potential in children? No doubt the use of real creative productions is more accurate and safer than the use of tests in evaluating creative performance. But in dealing with potentially creative children, are we going to wait until they grow up and are capable of producing creative acts? We may accept that a valid and reliable instrument could help in evaluating a sample of behaviour selected as representing creative thinking. Scientific investigation of actual creative people helps to identify such behaviour. Thus, we would be capable of identifying and developing creative thinking in young people.

Taylor and Ellison (1972) maintained that accurate prediction of creative performance requires measuring collectively a large number of personal traits in order to understand creative people. They emphasized the importance of studying both intellectual and non-intellectual traits that account for creativity. As a matter of fact these researchers considered non-intellectual factors to be more promising as predictors of creativity. They claimed that intellectual tests did not fulfil this purpose because they are not adequately designed to measure creativity in specific fields. However, these researchers stressed the point that the biographical approach is not a singular or simple one. They found at least 30 different dimensions on an inventory consisting of 150 biographical items. A valid inventory should therefore be developed which in turn can be a good instrument for detecting meaningful factors relating to creative behaviour. Creativity can take many forms, and so its measurement requires a generally applicable evaluation tool. But it is hard to find adequate

criteria against which an instrument once devised could be validated. Taylor and Ellison criticized creativity tests on the grounds that they require much time either for scoring or for administration. At the same time, some of these tests are of obvious validity and are difficult to administer. In developing an instrument for assessing creative behaviour that can be used easily to predict real-world creativity, Davis (1975) believes that the use of personality and biographical information is an appropriate approach for the measuring of creative behaviour. He formulated two assumptions. The first is that 'there are attitudes, motivations, interests, values and other personality traits that predispose a person to think and behave more creatively' (p.77). Attributes such as high energy, spontaneity, adventure, willingness to take risks, curiosity, attraction to complexity and mystery, multiplicity of interests and open-mindedness are thought to be associated with creativity. The second assumption is that 'biographical reports of past creative interests, habits, and activities are excellent predictors of future creative interests, habits and activities' (p.77).

On the basis of the above-mentioned assumptions, Davis (1975) developed the How Do You Think (HDYT) inventory. This inventory measures attitudes, motivation, interests, values, beliefs and other personality and biographical information related to creative behaviour. From theoretical and empirical evidence these variables were found to be good predictors of creativity. The central traits detected by the inventory were originality, ingenuity, a high energy level and curiosity. However, the results derived from use of the inventory led Davis to suggest that these traits are a necessary but not a sufficient condition for real creativity. He recommended the use of two criteria, such as personality inventories and teachers' nominations, in the process of identifying creative students. This

method could ensure an accurate selection of creative people.

Bergum (1975) investigated self-perceptions of creativity among academics. A questionnaire was given to 450 technical and scientific faculty members. There were 279 respondents, of whom about 40 had been awarded one or more patented inventions, the average being 3.1 inventions each. The inventors (N = 40) and the non-inventors (N = 239) were compared on seven discriminating items which Bergum had discovered during his previous research. Two items were found to yield significant differences ($p < .05$) between these two groups. The first item was 'Do you participate in team sports such as baseball, football, basketball or hockey?' ($\chi^2 = 5.13$, 1 df). The second item was 'Do you think of yourself as creative?' ($\chi^2 = 5.08$, 1 df). The inventors were found to be less oriented towards team activities (25% as against 46%) and to perceive themselves as more creative than the non-inventors. Creative persons tended to be relatively independent-minded, self-sufficient and confidently aware of their creative abilities. There is a noticeable similarity between these characteristics and the traits of creative people as discerned by Mackinnon's research.

Domino (1970) carried out a study aimed at developing a scale for identifying potentially creative persons using Gough's Adjective Check List (ACL). Using the ACL, teachers rated faculty students who had exhibited creative abilities in their academic performance. The nomination process was based on Mackinnon's criteria of creativity which included originality, adaptiveness to reality, and elaboration of original perception. The creative students (N = 59) were compared with a control group (N = 82) who were matched in terms of sex (they were all male), age, intelligence, adjustment and degree obtained.

The creative students significantly surpassed their counterparts on the creativity measures. These measures were the Barron-Welsh

Revised Art Scale ($t = 2.22$, $p < .05$), Guilford's Alternate Uses ($t = 10.39$, $p < .01$) and Mednick's Remote Associates Test ($t = 3.09$, $p < .01$). A creativity scale (Cr) was developed from the 59 items which were most frequently used by the teachers to describe the group identified as creative on the basis of the 300 ACL items. This creativity scale was cross-validated, using a sample of 400 creative adolescents (in science, art or literature) and a sample of 400 appropriate control subjects. The following are sample items from the Cr scale:

- absent-minded	- demanding	- inventive
- alert	- egotistical	- outspoken
- argumentative	- hurried	- reflective
- capable	- independent	- sarcastic
- complicated	- insightful	- sharp-witted

Standard deviations, critical ratios and point-biserial correlation coefficient between the ACL and the Cr scores and group membership (creative or control) were used in the cross-validation of the Cr scale. The comparisons between the groups proved to be significant. No sex differences were found on the creativity scale.

This study by Domino indicated that the creative student was both active and aloof, enthusiastic and reserved, humorous and serious, sensitive and tactless, rational and unconventional. Similar opposing elements in the personality of creative people were found by a number of studies. Among the characteristics found in this study were those distinguishing the highly creative adolescent:

> He is highly individualistic and unconventional, but in a constructive manner; he possesses enthusiasm, a spirit of adventure, and an eagerness to explore which are well utilized; he experiences considerable emotional turmoil

> and is quick to act, although these qualities appear to enhance rather than disrupt his functioning; humorous and sharp-witted, he is nevertheless serious, rational and mature.
>
> (p.51)

The important contribution made by this study was the development of a useful instrument for identifying creative people. The validity of this instrument was supported in the study by theoretical and empirical evidence.

Wright, Fox and Noppe (1975) studied the relationship between creativity and self-concept in a sample of university students. Previous studies had shown contradictory findings regarding the relationship between these two variables. This new study hypothesized (1) that a positive relationship would be established between self-esteem and creativity; (2) that self-esteem would be positively correlated with the subject's own evaluation of his creativity; and (3) that a positive correlation between creative self-esteem and creativity could be expected.

The subjects were 80 junior and senior education majors in a large urban university. Creative self-concept was measured by the total score on the Tennessee Self-Concept Scale. Two subtests from the Torrance Battery of Creativity Form B, Unusual Uses (verbal) and Incomplete Figures (non-verbal), were employed to measure creativity. These two tests were scored for fluency, flexibility, originality, and elaboration, and thus yielded 8 scores for each subject in the sample.

The creativity, creative self-concept and general self-concept scores were intercorrelated. The correlations between creative self-concept and three of the verbal creativity scores (originality, fluency and elaboration) were significant. Those between the general self-concept scores and the creativity scores, however, were not.

Positive correlation ($r = .25$, $p < .05$) was found between the creative self-concept and the general self-concept scores. The multiple correlations were used to examine the relationship between creativity and general self-esteem, and between creativity and creative self-concept. A significant multiple correlation was found between creative self-concept and the measures of creativity ($r = .44$, $p < .05$).

Thus the researches of Wright, Fox, and Noppe demonstrated that there was no significant correlation between self-esteem and creativity. It has also been stated by Cox (1926) that there have been a large number of creative persons throughout history who did not possess high self-esteem and that this variable was therefore not always a necessary condition for creativity. The correlation between the creative self-concept and the general self-concept, although significant, was low. Wright, Fox and Noppe concluded that the general approach to the measurement of self-concept was inadequate for the determining of the relationship between self-concept and creativity. It was recommended that items measuring the creative self-concept should be added to the tests of the general self-concept.

Research conducted by Malakula (1974) aimed at investigating certain personological variables as correlates of creative productivity in Thai architecture students. Malakula's main hypothesis was that there would be significant positive relationships between personological variables, creative motivations, attitudes and other personality traits, and creative productivity as manifested in real life situations. Malakula's tests were carefully checked in order to identify weakness stemming from cultural differences.

Malakula used two measures to identify the hypothesized

personological traits. These were Davis's 'How Do You Think' inventory (a verbal trait) and Welsh's 'Revised Art Scale' (a non-verbal test). The criterion measures of creative productivity were professors' ratings of creativity, independent judges' ratings of self-reported creative activities, and scores from the subjects' architectural course-work project. The sample was of 125 (90 male and 35 female) University students who were studying architecture. This particular field was chosen because it was believed that architectural work calls for both aesthetic and scientific creativity. Thus, the personality traits of highly creative architects may tend to reflect similar traits in the personalities of highly creative people in the wider population.

Malakula's (1974) research showed that personality measures were adequate in terms of their reliability and validity even though they were employed within a different cultural context. The rating criterion measures were also found to have high stability in terms of interrater reliabilities. Malakula's main hypothesis, which predicted significant correlations between creative personological variables and creative productivity, was, in respect of a general type of self-reported creativity, supported. Malakula states:

> Major personological correlates of highly creative individuals were identified as: energetic involvement and interests in creative activities; openness to novel and unusual experiences, risk-taking tendencies and originality; sensitivity, humour and playfulness; flexibility and freedom of expression, independence and self-confidence.
>
> (p.112)

No such evidence, however, was found when the criterion measures were more related to the specific type of creative performance.

Taylor (1959) believes that the essential nature of the organism is to shape or design its environment rather than to be shaped or

designed by it. This natural tendency can be disrupted by overwhelming social forces, which largely take the form of conditioning and of socialization geared to produce conformity. When not interrupted, however, this shaping force articulates itself in one or more psychological dispositions that may develop in stages. The initial stage observed in the young child is 'expressive spontaneity'. Here the child is shaping his environment, directed by internal forces, or acting out internal processes in the form of spontaneous dancing, finger painting, talking, or playing. These expressions are unique and individual, and have many of the characteristics of creative behaviour. This may be followed by a period of technical proficiency in which the child begins to shape material, toys, and collections such as stamp collections and the like. A child may learn many shaping skills and show great proficiency in games, crafts, and play. Later in life, the shaping takes the form of inventing, of the exercising of ingenuity in which a combination of materials is used in various ways. Development of this disposition has led to innumerable inventions such as the automobile, the aeroplane, and novel plots. Subsequent environmental shaping may take the form of innovative flexibility in which ideas are adapted, modified, and adjusted to new systems. Finally, the very shaping of ideas may result in what might be called emergentive originality, which at its highest creative level has given birth to such systems as psychoanalysis, evolutionary theory, relativity, and abstract expressionism.

For Taylor, transactional motivation (the natural force of shaping experience) and environmental stimulation are the two major sources of creativity. Since creativity has its roots in these two factors, it is necessary to encourage natural expression in one or

more of the varieties of behaviour described. This can be facilitated by a stimulating environment that may further trigger these natural shaping abilities. It may be necessary also to instil the appropriate skills for formulating problems so that this will culminate in products having creative characteristics.

Conclusion

The above-mentioned studies have dealt with creativity and personality variables in adults. The subjects were selected on the basis of creative products. It should be stated that it is very difficult to compare the traits of creative adults with those of potentially creative children who have not yet managed to achieve original works. Nevertheless, such comparison can give some indication of these children's attributes. Terman's gifted people (Terman, 1925; Oden, 1968) were highly intelligent, came from stable homes, were healthy, were encouraged by their parents to work hard at school, and had high motivation to achieve in their childhood. Guilford's studies (1950, 1962, 1967, 1975) have indicated that divergent thinking abilities are significant for creative behaviour. They have also stressed the importance of personality factors in such behaviour. The researches of Roe (1953a,b), Mackinnon (1961, 1962, 1963) and Barron (1955, 1968) have shown some of the specific mental and personal traits which distinguish creative persons. Such traits as independence, originality, industriousness and self-confidence were generally emphasized. The researches of Cattell (1963), Synder (1967) and Harvey et al. (1961) have also shown that some of the traits displayed by creative people have their origins in childhood. Davis (1975) developed the personality approach in studying creativity; he

believed that biographical information and information about the personality were good predictors of creativity. The work of Davis (1975), Bergum (1975), Domino (1970) and Taylor and Ellison (1972) had as its aim the development of creativity tests. Such tests involved traits similar to those reported by many of the other studies which have been discussed here. Malakula (1974) discovered a relationship between creativity and personality characteristics in a sample of University students. Taylor (1959) has spoken of creativity in terms of levels, a notion which can be helpful in the encouragement of students' creativity in particular.

On the basis of previous research, it seems that we cannot understand creativity in terms of intellectual factors only. Both intellectual and non-intellectual characteristics have to be considered. Creative people blossom owing to a unique blend of both personal and intellectual qualities. This fact was particularly emphasized by Wallach and Kogan (1965) and by Getzels and Jackson (1962). Still the most difficult problem in studying creativity, in children in particular, is the establishing of valid criteria governing predictors for its assessment. It seems, however, that the personality approach can help in this regard. This approach has been adopted in the present thesis, and it is hoped that this will be helpful in identifying creative children in Egyptian schools. Creative Egyptian children answered a personality inventory; following this, creative performances in two school subjects, Arabic and drawing, were rated by their teachers. The present research aimed mainly at studying the relationship between creativity and the I-E construct in this sample of children, and at shedding light on the influence of certain cultural factors upon creative development in Egyptian children.

Chapter Four

Creativity in Children

Introduction

Research into the characteristics of creative persons is necessary in order to achieve a better understanding of this group of people. In schools, teachers can help their potentially creative children if they recognize their traits and know how to deal with them. Such recognition is essential for the encouragement of creativity. Development of students' creativity should be considered an important goal to achieve not only for the students themselves but for society generally. Problems of different kinds require the contribution of creative individuals who may be able to find original and useful solutions to these problems.

The path that leads towards the development of students' creativity is not an easy one. Schools often employ traditional teaching methods which do not help in developing creatve behaviour. Most of these methods aim at achieving predetermined goals, and such methods are often established by authority alone. The main aim of schools seems to be to push students towards academic achievement which focuses only on one type of thinking, convergent thinking. Most methods of evaluation seem to be designed to serve this goal. But schools should consider all types of ability, and strive towards the development of the whole person. Schools should be places in which every student has the opportunity to express himself, discover, play, plan, and discuss.

This view has been expressed by Cook (1959) thus:

> There are many reasons why we in education should be interested in developing creative talent. First, the sum total of our civilization is the product of man's creative ability. All of our great explorers, inventors, artists and scientific discoverers have been motivated by a creative desire and have fulfilled their creative thinking abilities. In almost every field, creativity is the distinguishing characteristic of the truly eminent. The

> possession of high intelligence, special talent, and high technical skills is not enough to produce outstanding achievement. Second, being creative is essential to healthy personality development and mental health. There is no question that prolonged, enforced repression of the creative desire may lead to actual breakdown in personality. Stifling creative desire cuts at the very roots of satisfaction in living. Man's creative thinking abilities are his most important assets in coping with life's stresses. Third, creative thinking abilities are important in the acquisition of information and intellectual skills. This realization is upsetting many of our traditional concepts of education and causing us to take a new look at many current practices. Fourth, creative thinking is essential in the application of knowledge and in the achievement of vocational success. Scientific knowledge in our discipline, education, has not been nearly as powerful as it might have been in influencing what happens in schools. It is my view that the most important reason for this is that teachers and administrators have not been trained adequately to use imagination in applying such knowledge and developing new knowledge.
>
> (pp.1-2)

Egyptian preparatory schools are mainly concerned with students' academic progress alone whilst in fact they should consider the development of students' whole personalities. Problems such as crowded classes, lack of equipment, shortage of well trained teachers, and absence of appropriate evaluation procedures, problems besetting a great many preparatory schools in Egypt, prevent the achievement of this goal, i.e. personality development and creativity. School subjects are mainly taught for the acquiring of facts and concepts, and for memorization. There is no opportunity for using such information creatively, and there is thus little sope for students to think, question, and search for solutions. What is needed is for good teachers, guided by educational authorities, to use available resources in order to contribute to the genuine development of students' abilities and personalities. Recent findings in the area of creativity should be employed in Egyptian schools, in particular in preparatory schools.

Research into the creativity-intelligence distinction, e.g. that by Getzels and Jackson (1962) and by Wallach and Kogan (1965), has directed attention towards the role of other variables, such as personality factors, in creative functioning. Milgram and Milgram (1976) write:

> Intelligence is a necessary but not a sufficient component of effective problem solving. Effective problem solving in turn is associated with many aspects of personal-social adjustment.
>
> (p.193)

Creative children were found in a number of studies to be different regarding their personality traits from intelligent children. Weisberg and Springer (1961), for instance, compared gifted pre-adolescent students, identified by tests of creativity, with their equally gifted peers, as measured by tests of intelligence. The creative students were rated significantly on a number of personality traits. These were: strength of self-image, ease of early recall, humour, self-awareness, uneven ego development, unconventional responses, imaginative treatment of ink blots, independence from environmental influences, and readiness to respond emotionally to the environment.

Flexibility of thinking is another characteristic which has been found to distinguish creative from non-creative persons. This ability enables creative people to discover adequate responses in complex situations. Torrance (1965) has discussed the importance of creative thinking (of which flexibility is one of the attributes) for coping with stresses, especially those prevalent in our present civilization. Teaching children in an effective way that is conducive to creative behaviour is indeed a necessary virtue in this fast-changing world. This idea has been expressed by Torrance (1965) as follows:

> We are living in a world in which the rate of change is increasing rapidly ... It is impossible then to prepare children to cope with all of the demands they will need. They must indeed think divergently, not only to make the changes that move society forward but to respond constructively to the changes.
>
> (p.320)

Schools, then, should consider carefully the use of suitable methods for developing creative behaviour in students if they plan to create generations of creative people who are able to face changes and unexpected circumstances. Flexibility of thinking helps creative people to try different approaches to solving problems. There is a great need for developing in people flexibility of thinking and other creative abilities, such as originality and sensitivity to problems, in order for them to achieve high standards of living that will lead to happiness and satisfaction for all mankind. Creative thinking is also important for adjustment and self-actualization. Torrance (1965) had emphasized the critical role of creative thinking for human survival:

> History too reveals that man has many unsolved problems which he continues to try to solve by methods that have repeatedly failed. Thus, mankind might avoid much frustration by using more divergent thinking in solving problems.
>
> (p.320)

Milgram and Milgram (1976a, 1976b, 1976c) regard it as highly probable that the problems we normally associate with being creatively gifted arise during adolescence. Among younger creatively gifted children,they found little evidence of problems of adjustment, and believe that the problems they did find were exacerbated by adolescence. This they present as a possibility, and it is one we cannot discount.

Adolescent problems seem to arise in some creatively gifted

people as early as the age of 9, and quite often by the age of 11. This causes confusion among teachers and parents who may be anticipating problems at the age of 13 or 14 but who, faced with them is a 9-year-old or even an 11-year-old, immediately think in terms of seeking help.

For the creatively gifted, the idealism phase is an attractive one. The important thing to remember is that the creatively gifted person often enters the idealism phase earlier than his more normal fellows. The child himself can be ill-equipped to cope with it at the age of 11, let alone 9. His having to can be extremely disturbing to the adults around him. Such an early-appearing idealism phase should be treated in the same way as the adolescent idealism stage - neither put down nor taken too seriously. The child has merely reached it in pre-adolescence instead of mid-adolescence.

For the creatively gifted adolescent there is often a special type of role discontinuity. In childhood the values of teachers and parents have been ingested, and the creative child may have gained some acceptance among adults, and therefore among peers, by virtue of being bright. Then in adolescence comes the anti-scholarship climate. Suddenly and inexplicably what was acceptable in childhood (up to a point) ceases to be acceptable and becomes marginal if not unacceptable. A conflict situation can emerge. What is acceptable to parents and teachers (whose approval is still needed) is unacceptable to the peer groups on whom the adolescent depends for developing a meaning to life. It is often at this stage that the creatively gifted adolescent will deliberately under-achieve in order to gain group acceptance.

We must not suppose that the creatively gifted adolescent has

less need of a frame of reference from the adult world; if anything he has more need. He is better able to see the artificiality of the frames of reference created by his peers. His explorations of the adult world are undertaken with more critical selectivity and often with higher expectations than those of his normal peers. His peer groups are less adequate for him than for the normal adolescent. He needs the security of adult example and tutelage, especially if his explorations of the adult world have started earlier.

Glover and Tramel (1976) concluded investigations in two schools of pupils of the age range 14-19, who had been identified as having behaviour problems. They administered creativity tests and found a correlation between behaviour problems and scores for flexibility and originality. Also, they found that creatively gifted children tend to be rejected by their peers. Are the behaviour problems a reaction to rejection, or are the problems of adjustment more pronounced for the creatively gifted adolescent than for the normal adolescent? It seems that both are contributory factors. The process of increasing self-awareness may not always entail a process of awareness of oneself as creatively gifted. It may entail a feeling of something far worse, of being different. Sometimes the creatively gifted adolescent may react to this by wearing what Stone and Church (1973) describe as 'the (false) mask of independent aloofness worn by the outcast'. It is essential that those who are concerned with adolescents feel capable of controlling such situations.

The creative process is always accompanied by psychological stresses. Whilst involved in a problem, the creative person feels depressed as a result of anxiety stemming from lack of direction or from an inability to express ideas. With some creative persons, this

may be just a temporary state during the course of development, but with others it may mark the end of the creative process. When hypotheses are formulated, the creative person often feels satisfied and pleased. It seems that the process goes in stages, the time-scale and order of which is which is flexible, such as the finding of a problem, preparation, the finding of the solution, and the testing of the solution. Such stages vary from one field to another according to the nature of the problem, research methodology, and the thinker's own characteristics.

The creative 'solution' or product gives the creative individual a splendid opportunity, which he has really been seeking, to communicate his ideas to others. If the solution or the product is valued and appreciated by his group or society as satisfying a particular need, this leads to the creative person's gaining self-esteem. Indeed, the accepted creative product is a symbol of great shared experience.

Stein (1953) formulated a number of hypotheses concerning the creative phenomenon. He dealt with it as a mental process and as a question of personality factors which together create the necessary conditions for creative endeavour. He was also concerned with the relationship between creativity and culture. Creative people, according to Stein, are sensitive to problems, tolerant of ambiguity, and highly motivated. Such people appear to be deeply interested in finding solutions, where there exist gaps in knowledge in their areas of specialization. Recognition of such gaps creates in them states of dissatisfaction and unbalanced equilibrium. Creative people, however, never give up and are driven by powerful motivation to overcome obstacles. Stein (1953) writes:

> The creative person has a lower threshold, or greater sensitivity, to the gaps or the lack of closure that exist in the environment. The sensitivity to these gaps in any one case stem largely from forces in the environment or from forces in the individual.
>
> (p.312)

In addition, creative products satisfy people's needs:

> Thus creative art works resonate with feelings, while inventions resonate because they fulfil particular needs.
>
> (p.318)

There are many factors which influence creative development in a society. They include physical environment and geographical location, the philosophical orientation of the culture, level of cultural progress, educational opportunities and experiences available, political factors, economic factors and social organization.

Hetrick et al. (1968) studied the relationship between creativity, intelligence, and personality factors in a sample of primary children. This study was a replication of a previous investigation carried out by Hollingsworth (1965) (1), in which it was found that: (1) figural creativity includes two independent traits: the ability to deal with complexity and the ability to complete unfinished structure; (2) intelligence and creativity are independent; and (3) creativity is dependent upon personality variables. Thus it was hypothesized that: (1) the two independent creativity traits would be shown to be independent; (2)the achievement and intelligence measures would be independent from the creativity measures; (3) the personality variables (perceptiveness, sensitivity, complexity and independence) would be related to measured figural creativity.

The sample of Hetrick et al. (1968) consisted of 196 fourth-to-sixth-grade children, 103 boys and 93 girls, who were from

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(1) cited in Hetrick et al., 1968.

middle-class families. This group of children was given a battery of 14 tests as follows: 1. Independence Questionnaire; 2. Free Designs; 3. Children's Interests; 4. Sarbin Test; 5. Hidden Patterns; 6. Flexibility and Originality tests; 7. Children's Personality Questionnaire (CPQ); 8. Designs; 9. Barron-Welsh Scale of the Welsh Figure; 10. Preference Test; 11. Picture Completion subtest of the Wechsler Intelligence Scale For Children (WISC); 12. Sarason General Anxiety Scale For Children; 13. Production Of Figural Effects tests; and 14. Hidden Figures Test. Scores of some other relevant variables, such as teacher ratings of creativity and independence, grade point averages, IQs and Iowa Achievement Test composit scores, were also obtained.

Using factor analysis nine factors were extracted, as follows:

Factor A - Chronological age and general information

Factor B - Personal adjustment

Factor C - Sex typing

Factor D - School achievement and mental ability

Factor E - Divergent production of figural implications

Factor F - Intolerance towards ambiguity

Factor G - Production of figural systems

Factor H - Preference for complexity

Factor I - Self-confidence

The analysis confirmed that figural creativity comprises two independent traits. It was also found that intelligence and grades were independent of the factors of creativity and that personality variables were independent of creativity. In general, this study reached the same conclusions as that by Hollingsworth (1965). Of particular interest to the present discussion is the following

depiction of the creative child:

> The child who would do well on the measures with high loading on Factor G (production of Figural Systems) would be perceptive and happy-go-lucky, and would admit to common fears. Creative adults have been found to be open and perceptive but usually not too happy-go-lucky.
>
> (p.185)

It has been shown that Hetrick et al. (1968) studied only one aspect of creative ability, which was figural creativity. There was no attempt to investigate verbal creativity. The results of the study, therefore, are not comprehensive. If the study had included measurements of both figural and verbal creativity and had examined their relationships with the variables of intelligence and personality, more interesting results might have been revealed.

Csikszentmihalyi and Getzels (1973) investigated personality factors in order to establish whether art students could be differentiated from other students of the same age and sex. They also studied the interrelationship between students' personalities, values, and possible personality differences according to the field of specialization (e.g. commercial art, fine art). Finally, they examined the relationship between the personality factors and performance in art school and the relationship between personality factors of successful art students and those of eminent architects and scientists.

Csikszentmihalyi and Getzels decided to use normative personality instruments for assessing personality factors as this served to facilitate comparison between the results of their own study and other relevant results arrived at by previous research. The subjects were at the School of Art, Institute of Chicago. The data included the responses of 205 students (94 male and 111 female) to Cattell's Personality Factors questionnaire, and the answers given by 179

students to the Allport-Vernon-Lindzey Study of Values test. School grades and some other relevant information was available for analysis. Amongst other things, Csikszentmihalyi and Getzels found that the personality factors which seemed to distinguish creative artists from creative scientists were the following: low emotional stability or ego strength (C); low conformity to norms (G); high subjectivity and imagination (M); and low self-sentiment (Q3). They also stated that low conformity to norms and high subjectivity and imagination seem to be important requirements for the carrying on of artistic activities.

The notion, however, that low conformity is a condition for artistic creativity seems debatable. To be creative in the arts does one need to be nonconformist? Should one behave against norms? Many creative people throughout history have led a normal life. Nonconformity to ideas in the arts or sciences should be distinguished from nonconformity to social norms. Thus, a creative artist may be nonconformist in relation to his specialization, but quite conformist in respect of social values and social norms.

In a study of creativity and personality in high school students, Eisenman and Robinson (1967) applied a number of tests to a sample of 75 students who were selected from grades 10 to 12 and whose mean IQ was 106.01. A creative personality inventory, labelled 'Personal Opinion Survey' and comprising 30 items, was given to the sample. This inventory incorporated the following measures: (1) Tolerance of Complexity; (2) Tolerance of Ambiguity; (3) Scanning; (4) Independence of Judgement; and (5) Regression in the Service of the Ego. Some other relevant data (grades, birth order, sex) was also available. The analysis showed that the scores on the personality inventory were related both to originality and to preference for complexity

variables. Highly creative subjects preferred complexity. This trait was also found by a number of previous studies, for example Barron's (1955, 1968), to characterize creative adults. Eisenman and Robinson also discovered that there was no significant correlation between creativity and intelligence or between intelligence and polygon preference. It should, however, be mentioned that the small size of the sample might have affected the results.

Dauw (1965; 1966) examined the relationship between creativity and personality variables in a sample of senior high school students. Relevant to the present discussion of creativity and personality is Dauw's research into the relationship between creativity and the self-concept. Using the Torrance test of creativity, the students were classified into original thinkers and good elaborators. Self-concept was measured by a personality check-list. The scores on the check-list indicated that the highly creative boys and the low creative girls had a lower self-concept than the low creative boys. But it should be stated that Dauw (1965) did not suggest a total differentiation of modal groups or a modal personality. Dauw's data, however, confirmed previous findings and established evidence on the basis of which further developments in creativity concepts regarding adolescents could take place.

Dauw's results have important educational implications. Teachers and counsellors should appreciate that creativity in students can take different forms and that each type has its own characteristics. They should, therefore, help creative students to realize their potentialities and accept their limitations.

Dauw (1966) suggested that 'Counselors and administrators may profit from the awareness of such distinctly creative individuals to

treat them differently'. 'Thus', he suggested, 'such differential reaction to students' personalities and needs may lead to the students' better adjustment and attainment of theirs and society's goals' (pp.78-9).

Halpin et al. (1973) investigated the relationship between creativity and past experience in a sample of gifted adolescents (boys and girls). The sample involved 312 high school students who participated in a programme for the academically and artistically gifted. These students were given the University of Georgia Biographical Questionnaire (GBQ) and the What Kind of Person Are You? inventory (WKPAY). Previous research using this inventory (WKPAY) showed that subjects who obtained high scores were found to have personality traits similar to those of creative persons. The GBQ contains 118 items and yields scores on the basis of 15 different biographical factors in the case of girls and 13 in the case of boys.

In the girls' sample a multiple correlation coefficient of 0.70 ($p < .01$) between the 15 GBQ factors and the results obtained on the WKPAY inventory was found. Five biographical factors appeared to yield a multiple correlation coefficient of 0.63 ($p < .01$). These five factors, which explained most of the variance in the WKPAY scores, were as follows: (1) cultural-literary interest factor; (2) academic attitude factor; (3) popularity with the opposite sex factor; (4) maladjustment factor; and (5) scientific-artistic interests factor. In the case of the boys' sample, a multiple correlation coefficient of 0.65 (p .01) was obtained between the 13 GBQ factors and the WKPAY inventory scores. The results obtained from the boys' sample also revealed five biographical factors, which produced a multiple correlation coefficient of 0.62 ($p < .01$). These five factors were as

follows: (1) academic attitude factor; (2) athletic interest factor; (3) independence/dominance factor; (4) parental control factor; and (5) socioeconomic status factor. Thus, the findings obtained from the boys' sample were different from those obtained from the girls' sample. This was explained as being the result of the small contribution made by socioeconomic status regarding the biographical variables in the multiple correlation coefficient for the girls. In this connection Halpin et al. assert:

> These contrary results indicate that different background factors are likely to be influential in the development of the creative personality for boys and girls.
>
> (p.652)

A main finding of the research of Halpin et al. was that the reduction of a large number of biographical factors into a small number of meaningful interpretable factors proves to be an adequate approach for studying the relationship between biographical information and creative characteristics.

Reid et al. (1959) used peer ratings as a criterion of creativity. The aims of their study were to: (1) investigate differences in certain cognitive and other personality characteristics between creative and non-creative children; (2) study possible interactions of creativity with sex and socioeconomic factors; (3) compare certain characteristics of creative children with those of creative adults; and (4) study differences in the same cognitive and personality traits between boys and girls and between children of high and low socioeconomic status. The sample involved 48 seventh grade students, who attended a junior high school and who were selected, on the basis of sex, family status and peer nominations of creativity, from about 350 children and assigned randomly to eight subgroups. Measures of intellectual and personality attitudinal characteristics

were treated as dependent variables in the analysis of variance design.

The cognitive measures used in the study were the California Test of Mental Maturity (CTMM), the California Achievement Test (CAT), the listening science and social studies scales of the Sequential Tests of Educational Progress (STEP), and the mechanical reasoning and clerical speed and accuracy measures of the Differential Aptitude Test (DAT). The personality-attitudinal tests included the Junior Personality Quiz (JPQ), the Brown-Holtzman Survey of Study Habits and Attitudes (SSHA), Texas Co-operative Youth Study (CYS) and the McCandless Anxiety Scale (MAS).

The results of the study of Reid et al. (1959) showed that creative children were superior to non-creatives on almost all cognitive measures. Creative girls were superior to creative boys on cognitive measures. Children who came from families of high socioeconomic status were superior to those from families of low status on cognitive measures. In relation to these findings these researchers state:

> It is clear that cognitive ability, as measured by general intelligence, aptitude and achievement instruments, is closely related to the perception of children as creative by their peers. This finding is in substantial agreement with those of Cattell and Drevdahl (1955) and Drevdahl (1956) in their investigations of adults Ss, and it suggests a need for a further investigation of the personality characteristics of creative children with intellectual factors partialled out. The marked sex and family status differences in cognitive ability also bear out the findings of previous investigators.
>
> (pp.731, 733)

It should be noted, however, that a number of personality subscales (3 JPQ, 2 SSHA and 6 CYS) failed to produce significant F ratios for personality-attitudinal variables between the creative and non-creative children. This result was not consistent with previous

research on adults, and was explained by the fact that many of these measures had not been examined in relation to creativity in children before. Another possible reason for such divergence is that peer nomination of creative children was the main criterion for identifying creative subjects, while different criteria were used with adults. It may also be true that children could not adequately judge creativity in their classmates.

On the JPQ, the performance of boys and girls differed significantly on seven of its twelve factors. The SSHA scales differentiated between high and low creativity groups. Results derived from the CYS were of little value in distinguishing between high and low creative students. On the MAS the creative children were less anxious than the non-creative. The results on the JPQ factors showed that creative girls were

> more sensitive, imaginative, timid, friendly and kindly, and preferred adventures in imagination to those in fact. They tended to be more favorably disposed toward school, accepting of cultural standards, friendly to associates, lively, willing to go along with the group, talkative and excitable, fond of gay parties and constant variety and favorably disposed toward outgoing occupations like those of actor and lawyer.
>
> (p.735)

The creative boys were found to

> reveal more emotional hardness, practicality, independence, lack of artistic feeling, emotional instability, discouragement with oneself, dislike of learning, and surly reaction to authority and to associates. They tend to be more competitive, dominant, lacking in self confidence and favorably disposed toward mechanical interests.
>
> (p.735)

To sum up, cognitive measures were found to distinguish between creative and non-creative adolescent students, and this finding was consistent with previous results. However, findings on a number of personality measures were not in agreement with those reported in

creative adults. The researchers stressed the need for a comparable criterion for creativity among both children and adults.

One of the factors which influence children's creativity is adults' attitudes towards this ability. The concept maintained by adults of what constitutes ideal behaviour in children was found to be incongruent with the characteristics of creative people. Creative people are thought to be courageous in conviction, curious, independent in thought and action, inclined to involve themselves deeply in activities, intuitive, persistent and unwilling to accept the judgements of authority. Adults' attitudes towards such traits, however, were found by previous research to be unfavourable. Such attitudes may in turn lead to children demonstrating conformity rather than creativity.

In order to assess adults' concepts of ideal behaviour, Bachtold (1974) administered Torrance's check-list of creative characteristics to a sample of children, parents and teachers. The sample included 55 teachers, 34 parents and 146 children (68 elementary and 78 junior high school students). Of the results for children Bachtold concluded:

> It seems quite clear that while we may hope for, or even at times demand, the products of inventive and imaginative minds, we still are not rewarding behaviors which are found to be particularly facilitative for such productivity. The behaviors most prized by both elementary and junior high groups seem to indicate that rather than qualities which make for creativity, values expressed in the Puritan ethic are more closely perceived, that is, determination in applying energy to getting work done on time, and remembering well what is supposed to be done.
>
> (p.53)

The concept of ideal behaviour maintained by the teachers and parents was also not in line with creative personality characteristics. Rather, teachers and parents

> described a healthy person who is considerate of others and has a sense of beauty; curious (but not always asking questions); has a sense of humor and is sincere (but is never negativistic); self-confident (but not haughty); receptive to ideas of others (yet not bashful or timid); self-motivated and independent in thinking (without being domineering). The profile which emerges bears very little resemblance to the courageous risk-taking and intuitively creative personality.
>
> (p.54)

Thus, parents' and teachers' concepts of ideal behaviour are not encouraging of children's creativity. Such concepts may result in children's creative or unusual ideas being repressed, so that they come to depend upon others' thinking, lack aesthetic insight, and experience personality problems.

With regard to the influence of adults' attitudes on creative development in children, Guilford (1966) reported that, although gifted children have proved their value to society, they are often stigmatized as unadaptable, laughed at, and hindered in their attempts to develop their abilities. In addition, White and Williams (1965) wrote:

> Vast segments of our social order, especially our schools, are structured to legislate against and penalize the creative individual. Conformity to standards and ideals, rules and methods can strangle the very life from creative talent. It is paradoxical - the one student who seems most capable of coping with our age of revolutions - the creative youth, the true revolutionary, the student who can tolerate psychic tension, who will risk anything to solve or change an attitude, a method, or a problem, is our pedagogical misfit.
>
> (p.281)

It follows, then, that in order to let these creative people actualize themselves, teachers and parents should accept their characteristics and deal with them individually. In this way teachers and parents can truly serve creative children's interests. Children should also be understanding of the characteristics of their peers, and some effort to bring this about should be made by schools. Teachers and parents

are important figures in the life of creative children and have genuine impact upon their interests, values and attitudes. The more social and psychological freedom and safety the environment of creative people offers, the more opportunities there are for their capacities to flourish.

Hammer (1964) studied creative high school students who won art scholarships. They were classified by art professors, on the basis of a two-semester workshop, into three groups: (A) merely facile and lacking in creativity; (B) an indefinite group; and (C) a highly creative group. A pilot study involving 57 Art Scholarship winners was carried out. Its results showed that feminine characteristics were more pronounced among the highly creative students of group (C). The 'creative' category was restricted to those emphasizing authenticity in living and visual and emotional authenticity. The 'facile' category described those who were painting in a predominantly imitative way or who emphasized mere sterile technique. Female students, students of the pilot study and students in the middle group (B) were omitted from the main study. Then, a 7-point rating scale measuring the feminine components, a number of specific cards taken from the Rorschach, and the Thematic Apperception Test (TAT) were given to 23 male students in groups (A) and (C).

The results of Hammer's study were in the predicted direction. On the rating scale, the difference between the means of the two groups was 1.52 (SDs for the creative group were 1.20, and for the facile group 1.40, $t = 3$, $p = 0.01$). The two groups were also differentiated on the variables of high degree of strength, confidence, determination, ambition and power. Hammer concluded:

> It is, then, in a fusion of the feminine and masculine that part of these creative individuals lies. This integration allows the necessary sensitivity and intuition to combine with purposive action and determination.
> (p.414)

Thus Hammer's results indicated that creative persons tend to have certain personality traits. For example, his creative males were distinguished on the basis of their exhibiting feminine interests. This trait may cause problems to these people because in manifesting it they diverge from the norms. Such differences in personality traits in creative students need to be understood in order for those students satisfactorily to develop their potential.

Creative persons also have the ability to think in a variety of directions, which we call divergent thinking. Also, as has been discussed above, they exhibit some remarkable personality traits. Because of these differences regarding thinking and behaviour, creative people often face obstacles, and have therefore to cope with a great many stresses and anxieties. It is not surprising, then, that many potentially creative children need real help in understanding their own traits. Many creative persons have, we know, sacrificed their creative thinking abilities in order to gain acceptance from the society in which they lived (Torrance, 1962).

Mental health problems experienced by creative high school students were the topic of investigation in the study of Torrance and Dauw (1965). A total number of 107 senior students in a public high school were given the Torrance Tests of Creative Thinking, which included two verbal tests (Product Improvement and Unusual Uses) and two figural tests (Incomplete Figures and Circles). The originality and elaboration scores were employed to divide the sample into three groups. The students high on originality were 49 (23 boys and 26

girls), the high elaborators 32 (17 boys and 15 girls), and those high on both originality and elaboration 26 (12 boys and 14 girls). The Runner Studies Patterns Test (Interview Form III) was used to compare the kinds of stresses and coping strategies of the three creativity groups. Among the questions in this test were the following three concerning mental health:

> (1) What sort of situations are likely to give you a feeling of discomfort or strain? (2) When discouraged, how do you usually pull yourself out of the 'low' feeling? and (3) In your life so far, has there been anything which has created a special problem for you? Please indicate the nature of the problem.
>
> (Torrance and Dauw, 1965)

The 'high originals' more frequently reported as causes of discomfort and strain situations such as restriction on freedom, ridicule, rejection and deep empathy in tragedy. The high elaborators frequently named failure, inability to meet expectations, restriction on freedom and routine and boring work as causes of discomfort and strain. Those high on both originality and elaboration frequently mentioned restriction on freedom, ridicule, rejection and pressure of time. An example of the means these creative groups used to cope with stresses was the high originals tending to change their strategy and to resort to new projects, absorption in work and social activity. The high elaborators used withdrawal strategies, absorption in work, change in strategies and social activity. Those high on the two factors used changes in strategy, withdrawal and social activity as mechanisms for coping with stresses (Torrance and Dauw, 1965).

As examples of problems described by the three creative groups, the high originals frequently indicated problems with parents (disagreement, estrangements), social problems (shyness, social cleavages), and difficult decisions concerning college and work. The

high elaborators frequently reported problems connected with high expectations, problems with parents, and difficult decisions concerning college and work. Those high on both originality and elaboration frequently indicated problems related to meeting high expectations, problems with parents and social problems.

From the above-mentioned description, it seems that students high on both originality and elaboration are inclined to be similar to the high elaborator students in terms of the problems they experience. The opposite trend was evident in the other two comparisons (concerning situations causing discomfort, and coping strategies). All groups expressed their feelings about causes of discomfort, sources of problems, and the ways in which they managed to cope with such situations. Regarding the high originals, Torrance and Dauw (1965) state that

> the environment of the High Originals does not seem to hold very high expectations of them, tending instead to disparage them and frustrate their craving for independence.
>
> (p.127)

The results on the Runner Studies of Attitude Patterns Test showed that these creative students, compared with a norm sample of young people, were characterized by high experimental orientations, high intuitive orientation, high resistance to social pressure, low regard for rules and traditions, low need for structure and direction, and low passive compliance. The creative students were also low on control orientation and high on freedom, achievement and recognition orientations. In general, the highly creative subjects exhibited greater willingness to make commitments than did members of the unselected group (Dauw, 1965).

It is of great value for teachers, parents and 'significant

others' to recognize the above-mentioned characteristics of creative students. These need to be taken into consideration in order to encourage students' creative abilities and to help students to develop more understanding of their abilities, personality traits and environment. Attending to such considerations may also be useful in assisting the learning strategies and vocational choices of these creative young people. Otherwise there is a danger that these processes will be left entirely to chance and that creative students will experience intense stresses which will undoubtedly impair their creative functioning.

Schaefer and Anastasi (1968) devised a biographical inventory for evaluating creativity. Four hundred high school boys were tested and divided into Creatives and Controls in artistic and scientific fields. Teachers' nomination, supported by creative achievement, was the main criterion for selecting creative students. Schaefer and Anastasi criticized creativity tests on account of their limitations regarding certain aspects of creative behaviour and their exclusion of motivation. They praised the use of biographical inventories instead of creativity tests as an adequate approach to studying creativity correlates. This method was considered of special promise since it had been found in several previous contexts to be a valid predictor of many complex criteria. On this basis, the study aimed at developing and cross-validating biographical inventory keys against achievement criteria of creativity among high school boys. The creative students were divided into two categories, scientific and artistic. The artistic included those who studied graphic art and literature, and the scientific included those who studied sciences and mathematics. The sample was classified into four criterion groups, each including

100 students, as follows: (1) Creative Artistic (CrA); (2) Control Artistic (CoA); (3) Creative Scientific (CrS); and (4) Control Scientific (CoS).

The biographical inventory, which contained 165 questions, was formulated on the basis both of previous research in the area of creativity and of hypotheses regarding creativity correlates. These questions were categorized into five sections as follows: (1) physical characteristics; (2) family history; (3) educational history; (4) leisure-time activities; and (5) miscellaneous. The analysis of the data obtained required dividing each of the four groups into two groups of 50 students each, and this helped in the development of the scoring keys and in cross-validation. Through specific method, items in the final keys were chosen. These items differentiated between criterion and control groups with a compound probability of 0.05 or better. The data showed that creative students shared common attributes regarding their experiences as well as their personality characteristics. Notable differences between artistic and scientific creative students were also found. The results suggested that studying creative achievement in particular areas (for example in the arts and the sciences) would contribute towards better understanding of creative performance. The approach adopted to the measuring of creativity in young people applied in this study was more objective than in previous studies, since these researchers have considered both teachers' nominations and creative achievements in specific areas of study.

Walberg (1971) studied creative adolescents who were chosen on the basis of having won prizes and awards in arts and sciences. Walberg's study concerned itself with the following two questions: (1)

To what extent could award winning be predicted by measuring intelligence? and (2) What were the similarities and differences between those winning distinction in six areas, leadership, the visual arts, music, the performing arts, writing, and science? A notional random sample of 2,225 boys and 741 girls was used in this investigation. The researcher used 12 items from the biographical inventory devised by Taylor and Ellison which had effectively distinguished between arts and sciences prize winners and other students.

Walberg's results indicated that the correlations between intelligence and the areas of study were not significant. This confirmed previous findings concerning the relationship between creative productivity and intelligence. When multiple correlations between items of the biographical inventory and group membership in the areas of the research were carried out, the prediction of group membership for the boys only was significant ($p < .05$). The creative groups perceived themselves as more imaginative and creative, and as having more chance to express their creative thinking abilities, than other students. They were also successful and active in school, and appreciated the importance of intelligence in the achieving of intellectual goals. Finally, the creative groups were interested in additional reading (magazines, stories, books, etc.), and discussed with adults their views about possible future occupations. Creativity as it was defined in this study was found to be associated with

> (a) the stimulating qualities of the home, (b) a wide and high level of involvement in both school and out-side activities, (c) persistence and single-mindedness in following through activities despite difficulties and (d)

> strong intellectual motivation, although not necessarily extremely high levels of ability.
>
> (p.115)

Creative adolescents in Walberg's study were also more happily integrated into the school environment and into social activity than other students. It was also found that their behaviour was clearly affected by cultural values oriented towards conformity.

Walberg's research showed that the creative students, although not of high levels of intelligence, were able to achieve successfully in schools. This result sheds light on an important fact, namely that when these students are provided with a stimulating atmosphere they can do well in terms of academic achievement. Teachers frequently misunderstand creative students and consider them useless and unable to fulfil their duties at school. They often do not care about these students, and that is why such students become less motivated, day-dreamers and apt to dislike school. Thus this group of people, if they are understood by teachers, can perform remarkably in school and in society in general. For instance: creative high school students, when compared, in another study by Torrance and Dauw (1965), with an unselected sample on the Runner Studies of Attitude Patterns Test, were found to have different attitudes from the comparison group. A much greater proportion of the creative students than of the comparison group exhibited high experimental intuition and resistance to social pressure. More members of the comparison group than of the creative group, on the other hand, exhibited pronounced patterns of conformity to rules and tradition, 'planfulness' (need for structure and direction) and passive compliance. The highly creative group indicated higher creative motivation, a greater need to achieve excellence and a greater attraction to the unusual and unconventional.

The creative group tended to be more interested than the comparison group in making contributions to society, in obtaining power and control and in building things. Such findings concerning the attitudes of creative students make it clear that they possess attributes such as ability to resist being influenced by others, high motivation, a greater need to achieve excellence, unusual interests and willingness to contribute to society. These characteristics need to be directed and developed, and this can happen through such students receiving understanding and encouragement from good teachers.

Our knowledge about creative children, however, needs to be strengthened by further research if we are to find out more about such children's characteristics, attitudes, abilities, values and interests. In a review of the studies which have dealt with creativity correlates in children, Arasteh (1968) reported that the personalities of creative children have been examined in a variety of ways, such as through biographical and autobiographical reports of eminent adults, interviews with the mothers and teachers of the children, interviews with the children, personality inventories, and different tests and techniques which have been developed to distinguish creative from non-creative children. The author found that developmental trends had not been investigated, but that most researchers had indicated that character traits are consistent from early childhood to adulthood. On the basis of his review, Arasteh concluded:

> The resulting composite picture of the creative child is therefore a blurred and somewhat incongruent one.
>
> (p.91)

Raina (1971), working in India, investigated differences between high and low creative students on selected measures of cognition, personality and socioeconomic status. Using the Torrance Tests of

Creative Thinking as the criterion measure, Raina gave the tests to 500 students enrolled in 17 schools in three educational districts. In the final analysis 90 high creative and 85 low creative students were examined. The highly creative students exhibited more need for

> achievement, autonomy, dominance, chance and endurance than the low creative subjects as assessed by the Edwards Personal Preference Scales.
>
> (p.119)

Greater anxiety was noted in the low creative group. Significant personality differences between the sexes were also noted. A point which should be raised is that the criterion of creativity used by Raina was the Torrance Tests. The creative group therefore may not have been carefully chosen, since criticism has been directed at these tests in relation to their validity as a measure of creative abilities.

Goyal (1969)(1) studied creative middle school children. The researcher used his own creativity measure developed on the lines of Torrance's tests of creative thinking. He concluded that, as compared with their peers, who were less creative, the middle school creative children

> possessed a high level of energy, rejected repression and suppression for the control of impulses, were more introverted, were more independent in both thought and action, had open minds, could tolerate ambiguity and entertained opposing values.
>
> (p.119)

These characteristics were also found to distinguish creative persons in many other studies, e.g. those of Weisberg and Springer (1961), Hetrick et al. (1968), Csikszentmihalyi and Getzels (1973), Eisenman and Robinson (1967), Hammer (1964) and Davis and Rimm (1977), all of

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(1) Cited in Raina, 1971.

which have been discussed earlier in this chapter.

Davis and Rimm (1977) summarized the characteristics of creative people as follows: (1) high levels of self-confidence and independence, willingness to take creative risks and to be different from the crowd, unconventional independent thought, self-criticism; (2) awareness of their own nonconformity and creativity; (3) energetic, spontaneous, adventurous, sensation-seeking tendency; (4) preference for complexity and attraction to the mysterious; (5) playfulness and humour; and (6) artistic and aesthetic interests. They developed a personality inventory based upon the above characteristics in order to assess creativity in children. The empirical evidence obtained suggests that creative children have an identifiable collection of personological characteristics.

Personality development was the main area of investigation in a longitudinal study of highly creative adolescent students by Parloff and Datta. The aims of the research were: (1) to study the developmental changes of the students' personalities; (2) to study the students' personality traits before and after their specializing in sciences; and (3) to examine the effect of environmental factors upon creativity. The study was of high school seniors (male) who exhibited different degrees of creativity but who were equal regarding variables like intelligence and scientific aptitude. The researchers assumed that subjects achieving different creative performances would differ with regard to relevant personality factors. The potentially creative students were also compared, with regard to personality factors, with known creative adult groups.

These students took part in a competition for talented students which aimed to discover students whose scientific skill, talent and

ability indicated potential creative originality. The number of students included in the study was 572. These were boys of high scientific aptitude, who also carried out creative projects which were judged by specialists. These creative projects were used as the creativity criterion, the criterion of creativity being that

> (1) the applicant recognizes and formulates 'novel' relationships; and (2) such formulations are plausible and/or effective.
>
> (p.94)

The sample was divided into three groups on the basis of the students' rated projects, as follows: (1) High Potential Creativity (N = 112); (2) Moderate Potential Creativity (N = 137);and (3) Low Potential Creativity (N = 287). The study used the following personality tests: (1) The California Psychological Inventory (CPI); (2) Cattell's 16 PF Test Form B; (3) The Fundamental Interpersonal Relationships Orientation-Behaviour (FIRO-B); (4) Ego-Strength Scale; and (5) The Welsh Anxiety and Repression Scales. An adaptation of Rosenberg's High School Questionnaire and Shanan and Stein's Interpersonal Relationship (Childhood) questionnaire was used to collect information regarding social history and attitudes (Parloff and Datta, 1965).

The answers given by 536 students were available for analysis. In this report, only the findings on the California inventory were presented. Significant differences were found on this inventory between the three groups of the study. Four personality factors distinguished between Group I (High Potential Creativity) and Group III (Low Potential Creativity):

> (Group I) ... was more independent, autonomous, self-reliant and having broader interests (Achievement via Independence); more efficient, clear thinking and planful

> (Intellectual Efficiency); more perceptive, resourceful and rebellious toward rules and constraints (Psychological Mindedness); and more imaginative and impatient and less like the typical respondent in the pattern of responses to this test (Communability) than Group III.
>
> (p.97)

A clinical interpretation of each group's profile on the California inventory was obtained. Group I was described as possessing

> (1) a high level of intellectual ability ...; (2) a high level of resourcefulness ...; (3) the capacity for independent work ...; and (4) a capacity for original and innovative work.
>
> (p.98)

The clinical description of the low potential creative students in Group III, on the other hand, indicated them

> as appearing to be less concerned with individuality and freedom from external coercion, and showing less of the spontaneity which leads to creative expression.
>
> (p.99)

In general, the three creativity groups were described as 'highly motivated' and 'effectively functioning'. Group I and Group II, however, were judged to be more creative than Group III.

A comparison was also made between Group I and known creative research scientists and architects. The comparison of Group I with research scientists revealed that the high potential creative students

> were alike i.e. similar to the research scientists on three scales: Self-Acceptance, Good Impression and Femininity - i.e. they have a high sense of personal worth, low concern with creating a favorable impression and are hard-headed, ambitious and broad in interests.
>
> (p.100)

Comparison of results for Group I with Mackinnon's results for creative architects revealed

> similarities on ten of the eighteen scales (of the CPI). Both groups scored high on: Capacity for Status (ambitious, self-seeking, broad interests); Social

> Presence (poise, spontaneity, and self-confidence in personal and social interactions); Self-Acceptance (high sense of personal worth); Responsibility (dependable); Psychological-Mindedness (observant, spontaneous, talkative, resourceful); and Flexibility (adventurous, confident, humorous, rebellious, assertive). Both groups were low on: Sense of Well-Being (are somewhat defensive and self-doubting); Self-Control (tend to be aggressive and assertive) and Communality (imaginative, restless, impatient). The two groups were about average on the Achievement via Conformity scale (attitudes and behaviors which facilitate achievement where conformance is considered a positive behavior).
>
> (p.100)

Group I showed more similarity to the architects than to the research scientists. This was considered as evidence for its having genuine creative potential, since the architects were more highly selected on creativity than were the research scientists.

The results obtained by Parloff and Datta are interesting. Their sample was carefully chosen on the basis of students' performances in creative projects. That the sample was selected so carefully does credit to the methodology behind the study. Longitudinal research in the area of creativity is essential, because it can provide us with useful and reliable information concerning the nature of creative development from the time when potential ability is shown until such time as that ability becomes evident in real creative achievement. We cannot assume, though, that all individuals demonstrating the same level of creative potential will become creative in the future. Other factors, personal and environmental, must be considered when making such a prediction. The celebrated research of Terman and his associates, which was discussed in the previous chapter, began in 1921 and ended in 1956. It focused on 1,500 individuals of very high intellectual ability, and showed that their productivity was 90 books and 1,500 articles. The number of patents awarded to this group was 100, half of these being given to only two persons. Thus the

productivity of this large talented group was not as high as one might have expected. It is noteworthy that Terman's sample was selected on the basis of very high intelligence quotients (IQs 140+) as measured by the Stanford-Binet test, not on the basis of creativity measurements. What is needed now is longitudinal research with potentially creative children in order to observe creative development and other factors, personal and environmental, which influence such persons' productivity through the course of life.

Hudson (1966, 1968), in a study of British schoolchildren, employed divergent thinking and personality tests. On the basis of a personality test, the Personal Qualities Questionnaire, divergent (or creative) children were more likely to give violent responses, hold minority interests, be liberal and non-authoritarian, enjoy expression of personal feeling and show emotion. The divergers were also found to be characterized by their inability to disassociate their social and intellectual life, leading to outgoing, unconventional behaviour and superficial emotional adjustment. On the basis of these characteristics, Hudson hypothesized that these children would be neurotic extroverts. The findings on the Minnesota Multiphasic Personality Inventory (MMPI), however, showed these subjects to be neurotic introverts. Diverger children were differentiated from converger children on eight items of this inventory: 'frequent change of mood'; 'moody'; 'miserable'; 'lost in thought'; 'guilt feelings'; 'listless and tired for no good reason'; 'loses sleep because worried'; and 'disgruntled'.

Such characteristics of diverger children, since they are not viewed favourably, lead teachers not to like these children. Teachers always prefer converger, or intelligent, children because they find

that such children show more acceptance of conventional rules, and hold values rather similar to the conformist and middle-class values which they themselves for the most part hold. Evidence provided by research supports this notion (Torrance, 1965).

Clarke (1968) gave the Minnesota tests of creativity to a sample (n = 417) of children in two schools outside London; the children's ages ranged from 9 to 15 years. The results showed that the correlation coefficients between the Minnesota tests and the NFER verbal reasoning test scores were very small (0.0 to 0.4). The Minnesota battery had a reasonable level of test-retest reliability. The reliability coefficients of the verbal tests were stronger than those of the non-verbal tests. Clarke reported that the girls attained higher verbal scores than the boys in the two test sessions. It was also noted that there was an average increase of nearly 20 points in the performance of both boys and girls on the verbal tests in the second session. By contrast, no sex differences were found on the non-verbal tests.

Clarke reported that the Minnesota battery of creativity was not measuring a single and independent function of creativity. Thus verbal and non-verbal creativity should at the very least be thought of as separate functions. In general, it seemed that the battery was suitable for assessing creativity only in young children.

Clarke's investigation also involved the development of a British test, the 'Mischief Test' of creative thinking. Its test-retest reliability coefficients were between 0.64 and 0.85. The children's performance increased in the second session. In young children the correlations between the verbal and non-verbal tests were 0.70 in the first session, and between 0.60 and 0.80 in the second session. With

the older children the correlations were very small, similar to those obtained with the Minnesota battery. Clarke wrote:

> It would seem therefore that not only is one apparently testing different factors in each sub-test, but the material appears to be less suited to older children. (p.312)

Clarke developed a British spare-time activities list. The responses of children on an American inventory, 'Things Done on Your Own', were employed in the development of the list. Very low correlation was found between the two instruments. A modest correlation was found, however, between the list and the Minnesota battery scores (0.75 down to 0.35). The correlation between the list's scores and the Mischief test's scores (with young children) was significant (0.60 to nearly 0.70). With older children the correlation between these two tests was not significant. Clarke concluded that more empirical research is needed in the area of creativity measurement.

Finally, Clarke studied the relationship between children and their teachers and the attitudes of the teacher to children. Children preferred teachers to be kind, helpful and tolerant, and disliked those who annoyed them, told them off, and gave them boring lessons. The teachers preferred conformist traits and thought that such traits should be encouraged in children. Moreover, they thought that nonconformist traits should be discouraged. When asked to rate children's creativity, the teachers were not able to assess it adequately. The teachers preferred intelligent to creative children. This attitude, and its effect upon creativity, was expressed by Clarke (1968)thus:

> Teachers may feel annoyed and even threatened when creative or gifted children express unusual ideas, since

> these may well highlight the teachers' own inadequacy to deal with hypotheses of a challenging nature. Not only this but the teachers' authority and competence may be felt to be held in question. By the same token the creative child may feel oppressed by an unyielding and unimaginative authority when he would like to think or express his ideas in an exploratory way by asking awkward and difficult questions.
>
> (p.310)

Clarke's research drew attention to the need for a valid creativity concept and accurate measuring tests. Clarke concluded as follows:

> The whole question of 'creativity' is called into question and it would seem to be wiser to treat verbal and non-verbal 'creative' thinking as separate and distinct functions. To use the term 'creativity' as if it were a single ability suggests a return to the old faculty psychology, and in doing this we would be in as much danger of labelling children with a 'creativity' tag as we are of labelling them with the older one of IQ scores.
>
> (p.312)

Conformity to social norms may lead to the sacrificing of creative behaviour, especially in the case of young potentially creative children. Clarke explained that

> the skills which appear to be most necessary for a child of prepubertal and pubertal age are social conforming in character and these seem to result in the developing of self submissive tendencies designed to avoid ridicule by peers, ostracism, segregation and the acquisition of facility in reaching workable compromises (or in some cases the imposition of will through aggression and competition). The non-conformant will be likely to be met with hostility, rejection and humiliation by his fellows and so the deliberate suppression of unusual or new ideas may well take place in order to make life reasonably tolerable.
>
> (p.317)

Because of the problems involved in measuring creativity by means of tests, the present researcher decided to measure creative behaviour through the use of the personality approach in order to select potentially creative subjects for his research. This process included the application of a new personality inventory which has been found from recent research to be adequate in distinguishing between high and

low creative students. The inventory proved also to be valid and reliable on the basis of the statistical information collected from Egyptian schools. Teachers' ratings of children's creativity in the classroom were also employed in the Egyptian sample in order to secure a sound procedure for the selection of potentially creative children.

M. Bosse (1976) attempted to discover kinds of behaviour and personality characteristics of creative children who were in fourth, fifth and sixth grades and to examine possible differences in behaviour between creative and non-creative children. His study was concerned with developing a personality theory or model of highly creative children. Creativity was measured by the Torrance verbal creativity test and personality characteristics were assessed by a classroom creative behaviour schedule developed by the researcher. The dimensions included in the schedule were a combination of several traits which are mentioned in literature on creativity.

Bosse's sample comprised 24 classrooms which were randomly chosen from the classrooms in a suburban industrial school district. Eight classes from each grade level of the fourth, fifth, and sixth forms were taken. These classes represented a middle socioeconomic range in a community which was predominantly white. Students who had intelligence scores, using the Lorge-Thorndike cognitive abilities test, above 115 were given the Torrance test. Students who scored below 130 or above 150 on this test were selected for the research. High and low creative students were paired within each classroom on the basis of sex and IQ scores. This pairing resulted in the selection of 36 students. There was no significant difference in intelligence between the high and low creativity groups. A significant difference in creativity between the two groups was found.

The composite profile of the creative child in Bosse's research, as evidenced by the total behavioural model, was significantly related to creativity ($r = 0.35$, $p < 0.01$). This coefficient, although significant, was low, and it may have occurred because of the statistical infrequency of some sets of behaviour, or else because highly creative students probably did not differ on individual behaviour. The difference may only occur with the meshing of specific behaviour into an overall pattern or package. The profile of the highly creative children showed that they were independent in doing work, employed and appreciated humour, were approached academically and socially by others more than they approached them, engaged in disruptive behaviour, were calm and aloof from classroom routine, were able to handle frustration, did not interrupt others or stand openly against the majority, finished work rapidly, did not stop until the work was completed, exhibited social maturity in leadership, appeared more alert and aware, and did not day-dream as often in the classroom as low creative children.

The major contribution made by Bosse's research was the development of a schedule for observing the classroom behaviour of creative children. This approach seems an intellectually satisfactory one because it is based on a conceptual background. There were, however, some weaknesses, such as the pairing of students in terms of intelligence scores, which in fact led to a considerable loss of data. Intelligence could have been controlled statistically by using the analysis of variance technique. The second weakness was the selection of creative children on the basis of Torrance's verbal test of creativity only. Some other creativity criteria should have been employed in order to ensure a valid measurement of the concept.

Finally, the research involved a small number of students, and its findings are not therefore generalizable.

Lynch's (1967) study was designed to compare Dublin and Milanese school children by creative thinking ability as measured by the 'Espressioni' test devised by G. Calvi and his associates at the University of Milan. The test was translated into English and given to groups of boys and girls attending post-primary schools in Dublin. Creative children were selected on the basis of two criteria. The first criterion was that of ratings of Art and English teachers, and the second was Torrance's method of predicting creative performance using a Creative Science Scale and a Creative Art Scale. The creative group included 30 winners of well-known national competitions. The control group, or the less creative students, included 30 students who did not win national competitions. The following tests were answered by the sample:

(1) Test Espressioni - measure of creativity

(2) Otis Mental Ability Test (Beta Form) - an intelligence test with a verbal reasoning bias

(3) Raven's Standard Progressive Matrices - a non-verbal intelligence test

(4) A questionnaire which was used to collect certain other information regarding students' interests, hobbies and activities, vocational aspirations and parents' professions.

The results of Lynch's research indicated a significant difference between the creative and the control groups on the test of creativity: the creative students scored higher than the control students. Also, a qualitative difference distinguished the responses of the highly creative students from those of the less creative

students. The Espressioni test proved to be a successful instrument in discriminating between these two groups of students.

A second experiment was carried out to gain more information about the Espressioni test. The experiment included 240 post-primary pupils aged 13 to 15 years who were enrolled in single-sex day schools in Dublin. The schools included traditional secondary schools, with an academic bias, and technical and comprehensive schools, having a vocational bias. The students were given the following tests:

(1) Test Espressioni

(2) Tests of general intelligence: (a) The Otis Mental Ability Test and (b) The Raven Standard Progressive Matrices Test

(3) The Mill Hill Vocabulary Scale

(4) The Staffordshire Arithmetic Test

(5) The personal questionnaire

There was no sex difference on the Test Espressioni in the entire sample, but when the difference between the boys and girls in the two types of schools was examined, some differences were found. In the technical and comprehensive schools boys scored higher than girls. In the traditional secondary schools, girls scored better than boys. Meanwhile Calvi in Milan found that boys scored more highly than girls in all subtests of the Espressioni, except on a verbal test. Lynch concluded that

> there is no marked difference between the sexes and no evidence to show that one was superior to another because of their sex ... it was evident that the kind of differences that exist between them is not one of a higher or lower level of creativity but the manner in which they attack the problem, and the type of responses which was a reflection of either boys' or girls' interest patterns. (p.141)

When these pupils were compared by their scores on the creativity test according to age, the older boys scored significantly higher than those of the younger age group (at the .05 level). This trend was also clear in Calvi's research. Lynch's study revealed that there was no significant difference between the girls' scores when the comparison was made according to age. 'This', she wrote,

> could be explained by the fact that the girls in School B, whose overall average was very high, were those of the lower age group range and so balanced the difference one would naturally expect in more representative samples. (p.146)

When the pupils were compared by scores of intelligence, it was found that the pupils who were in traditional secondary schools had a significantly higher mean score than those who were in the vocational type schools. Since intelligence is an important factor in creative thinking, at least up to IQ 120, this difference between the two types of schools was to be expected. The ratings on originality and fluency, by peer groups and teachers, of those pupils in the high creativity group showed that only 30% of the high scorers were rated by their teachers as particularly bright and original, and that only 20% were nominated by their peers. The results also indicated that only 15% were rated high by both teachers and peers.

Lynch's (1967) study confirmed that the criterion measure of creativity was adequate in assessing creative ability in post-primary school pupils. Nevertheless, when the differences between the types of schools in terms of pupils' creative performance were examined, the study did not find any conclusive evidence. The difference in creative performance according to the age factor was significant only with boys, not with girls. If the groups had been highly differentiated according to the age factor, a more conclusive result might have been reached.

Studies reviewed in this section reveal that creative thinking is a mental function which is independent of intelligence (Getzels and Jackson, 1962; Wallach and Kogan, 1965; Eisenman and Robinson, 1967). This implies that in schools, assessment of students' abilities should not be made only on tests of intelligence. Schools should include measures of creative thinking in order to evaluate adequately students' mental abilities. As a matter of fact, measures of intelligence were mainly devised in order to predict academic achievement. Other talents such as creativity may be ignored if we depend on intelligence tests alone to identify able children. Adequate evaluation techniques are needed in order to obtain an accurate picture of children's progress in schools.

It has also been found that intelligence is a necessary, albeit not a sufficient, condition for creative performance. Personality characteristics are thought to be significant determinants in creative problem-solving (Milgram and Milgram, 1976b). Mackinnon (1962) has expressed the widespread view that beyond some minimum level of cognitive skills necessary for mastery of a particular field, non-intellective factors will determine creative performance in that field.

Creativity tests, though useful, are not very accurate instruments for evaluating creativity. It may be that the reasonable solution to the criterion problem in this area of research (especially where children are concerned) lies in using other criteria methods, such as teachers' ratings of creativity and biographical information regarding creative activities, along with creativity tests in order to ensure a sound procedure for identifying highly creative children.

The role of school and family in preparing children to think,

imagine, explore and create is a very important one in helping children to develop, adjust and feel happy in a world of change and stress. Torrance (1965) maintained that creative growth is important for effective and constructive behaviour. Children's understanding of their potentialities and environment may lead to creative responses (see also Lynch, 1967, and Clarke, 1968).

Significant relationships between creativity and personality variables in samples of young people are found in the studies of Hetrick et al. (1968), Eisenman and Robinson (1967), Dauw (1966), Halpin et al. (1973), Reid et al. (1959), Walberg (1971), Arasteh (1968), Raina (1971), Goyal (1969), Parloff and Datta (1965) and Bosse (1976).

Conclusion

Creative students have been found to be perceptive (Hetrick et al., 1968). Artistic creative students have been distinguished from scientific creative students by their high subjectivity and imagination, low conformity to norms, low emotional stability and self-sentiment (Csikszentmihalyi and Getzels, 1973). High creative students scored significantly higher than low creative students on a creativity self-concept scale (Dauw, 1965). Halpin et al. (1973) discovered a relationship between creativity and personality in a sample of highly gifted adolescents. Reid et al. (1959) found significant differences on cognitive and personal measures between creative and non-creative children. Feminine interests distinguished creative and non-creative students in the study of Hammer (1964). Hammer's creatives were also self-confident and ambitious. Biographical factors were found, in the study of Schaefer and

Anastasi, to differentiate scientific creative students from artistic creative students. Creative adolescents in Walberg's (1971) investigation perceived themselves as being more creative and imaginative than other students. Also, they were successful in their studies, and active in both school and society. Raina (1971) found that creative high school students were characterized by their need for achievement, their desire for autonomy, dominance, and endurance. Creative children in Goyal's (1969) study (1) were more energetic, introverted, independent and open-minded than less creative children. In the study of Parloff and Datta (1965), the creative students were independent, spontaneous, had broad interests, and were perceptive, resourceful and imaginative. Hudson's (1966, 1968) creative children were found to hold minority interests, to be liberal, to enjoy expression of personal feelings and to demonstrate more emotion and unconventional behaviour.

On the basis of this extensive review of research on creativity and personality in adults and children, (Chapters Three and Four) it can be concluded that comparison between the findings of these studies is not possible because different criteria were employed to assess creative thinking. Many of these studies lacked precision in terms of their experimental designs, i.e. suffered from small size of samples, insufficient instruments and inappropriate statistical techniques. In fact, some of these studies merely replicated previous research.

Another factor which deserves attention is that the vast majority of these reviewed studies were conducted in Western cultures, and there is no doubt that cultural factors affect ways of thinking and

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(1) Cited in Raina, 1971.

personality characteristics. Thus the present research was designed to examine the relationship between creativity and the personality variable the Locus of Control, the concept of which has been developed recently within a social learning theory. This relationship has not been investigated in Egypt, and very few studies in European countries have attempted to relate this variable to children's creative behaviour, although there have been a number of studies which have examined this relationship in adults. In addition, the present research will introduce some new instruments which will help Egyptian schools to identify potentially creative children and to give new insight into creative activity, individualism and reinforcement of creative thinking ability in classrooms. Finally, the conclusions of the present research may contribute to the adaptation of new learning strategies and methods of evaluation to Egyptian schools, which in turn may help creative development.

Determination of an adequate criterion against which creative subjects can be chosen is the main problem in creativity research. It has been shown in this review that many studies did not reach conclusive results simply because they used inappropriate criteria measures. The present researcher is convinced that the use of more than one procedure of identification ensures an appropriate and accurate approach to measuring creativity. The creative children in the present research were chosen on the basis of their scores on a new personality inventory which measures personality characteristics of creative persons. The inventory has been found to be valid in many European countries. Also, a pilot study in Egyptian schools proved that the inventory was valid in distinguishing creative from non-creative students in these schools. An important advantage of

using this inventory is that the results obtained through its use in Egyptian schools can be compared with American and Australian findings. The criterion of creativity in the present research also includes ratings of children's creativity which were given by the children's teachers of Arabic and drawing. Thus we believe that the approach adopted by the present research represents a suitable procedure for the studying of creativity in children, enabling us as it does also to take into account a number of educational and cultural factors appertaining in Egyptian schools. The following chapter will attempt a definition of the locus of control, and present research concerning both this concept in relation to other variables and the relationship between creativity and the locus of control orientation.

Chapter Five

Creativity and the Locus of Control

Introduction

The locus of control is a major personality variable which has proved to be an important construct in predicting human behaviour. Research in this area is gaining momentum. Less attention, however, has been given to examining the relationship between the locus of control and creativity. This chapter deals with the concept of Internal-External Control and with the studies which have employed this concept in many areas of personality research. In addition, it deals with research in the two areas of the I-E control and creativity.

The Locus of Control: Its Definition and Relationship with other Variables

It is known that rewarding a response makes it more likely that the response will be repeated by the subject. If we carry on rewarding a response we expect that it will be strongly established, to the extent that it would be produced again in similar situations. Likewise, a response which is repeatedly punished would not be produced again. This law of reward and punishment is applicable to both animal and human behaviour. However, human behaviour is so complicated that other factors may affect a response's occurrence. Factors such as information, experience, and perception of causality influence the expectation of reward in the case of human behaviour (Rotter, 1971a,b).

From the social learning theory perspective, human behaviour is controlled by two fundamental factors: first, the values of the goal an individual is aiming to achieve; and secondly, the expectation that a specific type of behaviour will contribute in the process of the

achievement of the goal. The potentiality of occurrence of the particular behaviour that satisfies some need (need potential) is a function of two factors. These are: the expectation that this behaviour will lead to these reinforcements (freedom of movement), and the strength or value of these reinforcements (need values). As a matter of fact, the concept of freedom of movement represents the standpoint from which the locus of control construct has been approached in the social learning theory (Lefcourt, 1982).

Rotter (1954) defines 'personality' as a construct, which describes that aspect of a unified, complexly organized person that has to do with his characteristic modes of behaving or of interpreting the world in which he lives. Rotter conceives of behaviour as having direction or as being goal-directed. He sees personality as a 'directional interaction of the organism and his meaningful environment' (p.99). Rotter has also pointed out that persons who in general believe they can have a large measure of control over desired outcomes expect to gain those desired outcomes and accomplish their goals. Since one's expectations would seem to involve certain motivational orientations, the I-E construct is concerned with numerous views of the processes by which behaviour is impelled and sustained.

The social learning theory of Rotter (1966) considers that the expectation of rewards is primarily dependent upon the strength and frequency of those rewards. If, however, an individual believes that rewards occur independently of his own actions or personal traits, his behaviour will certainly be different from that of another individual who sees that his behaviour is related to subsequent outcomes. These differences in individuals' beliefs regarding the connection between

behaviour and outcomes represent a distinction between internal and external locus of control persons.

Rotter (1966) has defined the Internal-External (I-E) Control as follows:

> An event regarded by some persons as a reward or reinforcement may be differently perceived and reacted to by others. One of the determinants for this reaction is the degree to which the individual perceives that the reward follows from, or is contingent upon, his own behaviour or attributes versus the degree to which he feels the reward is controlled by forces outside of himself and may occur independently of his own actions ... a perception of causal relationship need not be all or none but can vary in degree. When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture, it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted in this way by an individual, we have labelled this a belief in external control. If the person perceives that the event is contingent upon his relatively permanent characteristic, we have termed this a belief in internal control.
>
> (p.2)

A generalized expectation develops regarding the nature of the causal relationship between one's own behaviour and its consequences. As an infant grows and acquires more experience he differentiates between events which are causally related to preceding events and those which are not. It follows as a general hypothesis that when the reinforcement is seen as not contingent upon the subject's own behaviour, the occurrence of reinforcement will not increase an expectation so much as when it is seen as contingent. Conversely, its non-occurrence will not reduce an expectation so much as when it is seen as contingent.

Thus the internal-external construct has been conceptualized by Rotter's (1954; 1966; 1971) social learning theory to indicate the extent to which a person feels that his own behaviour determines what

happens to him. This is called internal orientation. By the same token, the extent to which a person feels that what happens to him is determined by fate, luck, chance, or by other factors beyond his control indicates an external orientation. On the basis of this distinction a person relying upon his past reinforcement experiences develops a consistent attitude, tending towards either internality or externality in accordance with the source of reinforcement.

Although Rotter (1966) outlined how locus of control expectations generalize from a specific situation to a series of situations which are perceived as related or similar, he also emphasized the importance of situational context in determining behaviour. Generalized locus of control expectations will result in characteristic differences in behaviour in a situation culturally categorized as chance-determined versus skill-determined, and these generalized expectations may produce individual differences within a specific situation. Social learning theory states that the more clearly a situation is labelled as skill- or luck-determined, the closer the role such a generalized expectation would play in determining individual differences in behaviour. Rotter and his associates view behaviour as being the product of both situation-specific factors and of a generalized expectation that cuts across specific situations (Rotter, Chance and Phares, 1972).

Internal locus of control people can be expected to possess personality characteristics which distinguish them from externally oriented people. Research findings support this notion and provide evidence for the validity of the I-E construct. Internals are characterized by their active attempts to control events rather than simply let things happen without making efforts to control them. In

the domain of achievement, these persons are more strongly motivated towards achievement of standards of excellence than externals. Internals are also better in their adjustment than external persons. They are capable of striving for long-term goals, delaying gratification, and influencing others. In addition, internals are more perceptive, inquisitive, curious and efficient in assimilating information than externals (Phares, 1976a,b; Lefcourt, 1982).

The interaction between cognitive activities is one of the important issues with which social learning theory has dealt. The child who perceives the relationship between his behaviour and its outcomes is considered to be assimilating new experiences. In other words, the child will not learn from his experiences unless he realizes that the outcomes are associated with his own actions. Depending on the contingency between behaviour and consequences, people learn from their experiences.

The idea that locus of control is related to cognitive activity appeals to common sense. Persons holding internal control expectations should be more cautious and calculating about their choices, involvements and personal entanglements than are individuals with external control orientations. Otherwise, the probability of internals being able to regulate their experiences would be lessened which, in turn, would diminish the degree to which they could remain actors rather than pawns of fate. Such self-direction should entail more active cognitive processing of information, relevant to the attainment of valued ends, and should be reflected in the types of strategies that characterize an individual.

A large number of studies have examined the I-E construct in relation to personality factors (see for example Nowicki and

Rowntrees, 1971; MacDonald and Davis, 1974; Corsuch, Henighan, and Barnard, 1972; Throop and MacDonald, 1971; and Entwistle, 1986). Nowicki and Roundtree (1971) conducted a study in which a sample of secondary school students was tested. The researchers attempted to study the relationship between the locus of control and the variables of achievement, popularity, involvement in extra-curricular activities, ordinal position and intelligence. The sample involved 87 students, 38 girls and 49 boys who were in grade twelve. All but high social class students were represented in the sample.

The students were given the Nowicki and Strickland locus of control scale. They were also asked to list five students who they would choose to be president of the class and five other students whom they would like as friends. Their scores on the California achievement test, the Otis intelligence test and the extra-curricular activity measure were also available.

The results revealed that there was no relationship between the locus of control scores and intelligence scores or between the locus of control scores and the friends' ratings. The locus of control was related to achievement in the boys' sample and to engagement in extra-curricular activities in the girls' sample. This result was also supported by previous research. Sex differences were partially explained in the light of cultural factors: males are rewarded more than are females for academic achievement, whereas females are rewarded more than males for involvement in extra-curricular activities. Finally, it was suggested that a familial interaction between the sex and birth order of a child was an important factor which led to experiences that determine internal or external locus of control.

Bartel (1971), in a study of the relationship between locus of control and achievement in children, administered the Bialer Locus of Control Scale for Children to lower- and middle-class children of the first, second, fourth and sixth grades (N = 431). Achievement was determined by the scores on the Iowa Test of Basic Skills and Metropolitan Achievement Test. The results showed that children in grades one and two did not differ significantly on locus of control. But by grades four and six the differences had become significant. For both lower- and middle-class children locus of control and achievement were positively correlated. The findings were interpreted in terms of the social control function served by the public schools.

The influence of cultural factors on the development of locus of control was investigated by Hsieh et al. (1969), who studied the relationship between internal-external control and ethnic group membership. Their sample comprised Chinese, American-born Chinese and Anglo-American high school students. It was assumed that, compared with the American students, the Chinese would exhibit higher preferences for I-E items, indicating external control. A significant relationship between the locus of control and ethnic group membership was found. Hsieh et al. concluded:

> It appears that a cultural orientation may be closely linked with a personal belief in Internal versus External control. Individuals raised in a culture that values self-reliant individualism, pragmatic ingenuity and personal output of energy are likely to be more internally oriented than individuals from a culture that leads to emphasize a different set of values.
>
> (p.124)

Awareness and realization on the part of official institutions, cultural and educational in particular, of the influence of environmental factors upon the development of individuality, independence and internal control indeed represents a significant step

towards active change or promotion of cultural values. Thus, one responsibility of schools is to provide students with experiences which develop internal locus of control, independence and self-confidence.

Warehime and Foulds (1971) examined the relationship between the locus of control and personal adjustment. On the basis of relevant findings, they expected that internal locus of control and personal adjustment would be related. Their sample was made up of 55 male and 55 female university students who were given the Rotter Internal-External Control of Reinforcement (I-E) Scale and the Personal Orientation Inventory (POI), a measure of self-actualization. For females more than for males, the major POI subscale, Internal Support, was significantly ($p < 0.01$) related-in the predicted direction-to I-E scores.

Thus Warehime and Foulds's findings revealed that the relationship between internality and personal adjustment was more evident in females than in males. An attempt was made to explain these sex differences in terms of reinforcement value. Warehime and Foulds pointed out:

> It may be speculated that internally oriented males in this population believe that they are in control of their reinforcements for other reasons than internally oriented females. And, in the present instance, it could be assumed that the POI measures a type of personal adjustment not as highly valued by males as by females. Perhaps self-actualization is a value pursued by some groups, while others pursue other goals and feel internally oriented when such goals are obtained.
>
> (p.251)

We may add that owing to the small size of the sample and to the use of a single measure of personal adjustment, Warehime and Foulds's findings did not yield complete support for the notion that there would be a relationship between the two variables.

Nowicki and Strickland (1973), in attempting to develop a measure of the locus of control in children, affirmed that there already existed a large number of studies which assessed the variable in adults. They felt, therefore, that it was important to devise a scale to measure this variable and its correlates in children. A number of attempts aimed at developing I-E scales in children were reported by the researchers. But these had not been successful in establishing a valid scale. In order to assess the locus of control concept adequately, Nowicki and Strickland (1973) postulated a number of relationships as necessary conditions for the development of a valid instrument. These relationships were:

> (a) Scores will become more internal with increasing age;
>
> (b) Scores will be related to achievement, with internals achieving more than externals;
>
> (c) Scores will not be significantly related to measures of social desirability or intelligence.
>
> (p.149)

The Nowicki-Strickland Locus of Control Scale for Children consisted of 40 questions. Subjects were asked to answer these questions either 'yes' or 'no' according to how they really felt. The forty questions covered interpersonal and motivational areas and aimed to detect beliefs in internal or external reinforcement. Empirical evidence was presented indicating that this scale was both a reliable and a valid instrument. As had been hypothesized, there was no relationship between the test's scores and either social desirability or intelligence. Contrary to the hypothesis, however, there was no relationship between the test's scores and academic achievement. Additional findings had given further construct validation to the scale when it had been correlated with factors such as popularity,

ability to delay gratification and tolerance toward other races. Internally oriented subjects obtained high scores on these factors.

Crandall et al. (1965), in a study of children's loci of control in academic achievement, stressed the point that different forms of external environmental forces have to be distinguished from each other if this construct is to be properly measured. Control by other people must be distinguished from control by impersonal forces. Academic success and failure, for example, depend on the quality of students' work, but are still to some extent determined by teachers' behaviour. Responsibility for positive outcomes was also differentiated from responsibility for passive outcomes because of the differences in dynamics of feelings in each case. In fact these distinctions in internal-external control proved to be useful in understanding factors relating to school achievement. The Crandall et al. instrument, the 'Intellectual Achievement Responsibility Scale' (IAR), was developed on the basis of these distinctions. The scale yields two separate scores for children's belief in internal responsibility, one for success (I+) and one for failure (I-), as well as a total score (I tot) for internal beliefs concerning intellectual and academic reinforcements.

Ghee and Crandall (1968) performed two experiments in which elementary and high school students' locus of control was tested by the IAR scale of Crandall et al.. The independent variable in both was the degree of realization of responsibility a child perceives in relation to success or failure in academic-intellectual situations. The dependent variables were two measures of academic performance and achievement test scores. The results of the first experiment revealed significant F ratios for both sexes on all main effect analyses of the

three scores on the IAR scale. All students regardless of sex who had high scores on this scale were also found to be higher on report-card grade averages. Both (I+) and (I-) subscores were predictive of grade averages, and at comparable levels of prediction. Also, the high internal students of both sexes obtained higher achievement test scores than low internal students. The second study, however, showed that the relations between the IAR scores and the grade average for girls were not significant. But the boys who scored higher on the I tot and I-scales had significantly higher grade averages ($p < .05$, $p < .01$). In these two studies, girls' performance was consistent with their beliefs in internal responsibility for success and failure, while boys' was more consistent with a belief in internal responsibility for failure alone. In general, these results revealed that there was greater consistency of prediction across age levels for grades than for achievement test scores.

Joe (1971), in a review of research which had dealt with the locus of control, presented evidence supporting the validity of the Rotter concept of internal-external control of reinforcement. Studies reviewed in the area of measurement using the Rotter I-E scale showed that the test-retest reliability coefficients which employed a variety of samples ranged from 0.48 to 0.84 (significant). Internal consistency coefficients ranged from 0.65 to 0.79 (significant). The validity of the scale was established by finding low correlates with variables such as intelligence, social desirability, political affiliation and attitudes toward international relations. Although it has been claimed by Rotter that the I-E scale is free of the social desirability set, significant correlations were found between scores on the scale and social desirability scores. Sex differences on the

scale were also noted; females were significantly more external than males. Such differences were explained as being due to geographical differences and sex role identification.

In the area of personality, Hersch and Scheibe (1967) (1) carried out a correlational study in which the I-E scores were related to the California Personality Inventory (CPI) and the Adjective Check List (ACL). Of particular interest was that these researchers found that

> internally oriented Ss were higher than externally oriented Ss on the Dominance, Tolerance, Good Impression, Sociability, Intellectual Efficiency, Achievement via Conformance and Well-being scales of the CPI. On the ACL internally oriented Ss were more likely to describe themselves as assertive, achieving, powerful, independent, effective.
>
> (p.622)

In addition, several investigators have studied the relationship between I-E scores and personality factors. Findings suggest a cluster which is logically congruent with the concept of locus of control. By contrast with externals, internal persons were found to be less anxious, less aggressive, open-minded, self-confident, insightful and concerned about social approval. Joe (1971) concludes:

> It seems clear that Rotter's concept of internal-external control of reinforcement has stimulated a considerable amount of research which has, on the whole, substantiated the concept's usefulness in several areas of psychology. The most significant evidence for the construct validity of the internal-external control variable lies in the area of personality functioning. While findings are not remarkably consistent, generally data tend to support Rotter's contention that the internal-external control concept is a generalized expectancy operating across many situations.
>
> (p.634)

Interestingly, many of the above-mentioned traits found by research to characterize internally oriented people, such as their

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(1) Cited in Joe, 1971.

striving towards long-term goals, dominance, assertiveness, independence, industriousness, and adjustment, were also discovered in creative people (the characteristics of creative people are discussed in the previous chapters). Accordingly, the present researcher believes that there may be an association between the internal control and creative behaviour. In spite of the evidence which supports the value of the I-E construct in explaining behaviour, the construct has not received a great deal of attention from researchers studying the creative personality. The lack of research in this area (particularly concerning children) motivated the present researcher to examine empirically the relationship between creativity and the I-E construct in a sample of Egyptian preparatory school children.

In the preceding section, an attempt has been made to explain the Locus of Control Concept and to indicate its value in understanding human behaviour. It has been shown that the concept is valid, rich and can be applied to many important fields in psychology. Nevertheless, the concept has been criticized by some researchers, who claim that the I-E scores account only for a small portion of the variance. Phares (1976a), however, interpreted this not as a defect but as an aspect of validity and pointed out that rather than seeing it as a weakness

> it could just as easily be regarded as further evidence of the robustness of the concept. Criticism of I-E as accounting for only a small percentage of the variance suggests that one is implicitly accepting a core approach to personality. Such an approach derogates the role of more situation-specific factors, or at least over-emphasizes the role of dispositions.
>
> (p.21)

It has been argued that the construct has emerged from social learning theory. According to this theory, man's behaviour is determined by his goals; behaviour is always directional. An

individual responds with the behaviour that he has learned will lead to the greatest satisfaction in a given situation. Each person gradually associates certain goal objects and internal conditions with unlearned or inborn satisfactions. As differentiated from the unlearned or biologically based satisfactions of the organism, the psychological motives are the result of experience rather than instinct. Gradually a set of differentiated motives or needs develops in each individual, varying from the very specific to the very general. The more specific the category of behaviour and goals included in the need, the more possible it is to predict the strength of one from another. The more general, broad or inclusive the concept, the less accurately is it possible to predict one behaviour from another.

From this point of view, a need has three essential components. One of these is the set of behaviours directed towards the same goal (or to similar or related ones). The second is the expectation that certain behaviour will lead to satisfactions or goals that are valued. The third is the value (need value) attached to the goals themselves - that is, the degree to which an individual prefers one set of satisfactions to another.

Another major aspect of social learning theory is the weight it gives to the psychological situation of the individual in terms both of understanding and of predicting his behaviour. In contrast with any personality approach that places all the stresses on internal states, this view, because of its basic learning theory assumptions, emphasizes that an individual learns through past experiences that some satisfactions are more likely in some situations than in others. Individual differences exist not only in the strength of different

needs but in the way the same situations are perceived. An individual's reactions to different situations depend on his own past experience, which therefore constitues an important aspect of individual differences. The psychological situations, then, provide the cues for a person's expectations that his behaviour will lead to desired outcomes.

Frequently when an individual places high value on a set of goals, such as the desire for recognition or the desire to be taken care of, he may at the same time have low expectations of achieving these goals. That is, he may have learned to anticipate punishment, failure or rejection when he attempts to achieve these desires. Sometimes he tries to obtain the satisfactions by unreal means such as day-dreaming or the use of symbolic techniques which represent to him, but to no one else, the obtaining of the satisfaction. This avoidance and unreal behaviour is learned, and constitutes what is usually regarded as the symptoms of abnormal behaviour. On this basis, then, abnormal behaviour is not a desire, a disorder or a breakdown, but a meaningful attempt to avoid certain punishments or to obtain certain gratifications on an unreal level.

To sum up, the potentiality of a given behaviour or set of behaviour patterns occurring in a specific situation is dependent on an individual's expectation that the behaviour will lead to a particular goal or satisfaction, the value that satisfaction has for him and the relative strength of other behaviour potentials in the same situation. It is assumed that often the individual is unaware of the goals (or meaning) of his behaviour and of what are his expectations of achieving these goals.

It can be seen that the understanding of individual behaviour in

complex social situations is extremely difficult, requiring intensive study and much information. One particular implication of social learning theory of special importance for the procedures of assessing personality is that the situation of testing, itself, has an effect on behaviour which must be taken into consideration before predictions regarding other kinds of situation can be made on the basis of the test in question. From the point of view of social learning theory, in diagnosing personality not only must the individual's behaviour (need potential) be assessed, but also his expectations and the value he places on different goals. It is important to know how these expectations change from situation to situation and how the obtaining of one set of satisfactions runs into conflict with another. Finally, for the purposes of psychological treatment, it is frequently important to know how best to change people's expectations.

Research on Creativity and the Locus of Control in Personality

Research on creative personality traits reveals independence in thought and action as a characteristic consistently associated with creativity (Getzels and Jackson, 1962; Mackinnon, 1975; Roe, 1952; Rogers, 1959b). In discussing the high scores obtained by creative persons on a Social Dominance Scale, Barron (1955) described high creative persons as having a strong need for personal mastery. According to Barron, creative persons insist upon self-regulation and resist acculturation when it seems to them to be demanding surrender of one's unique and fundamental nature. Dellas and Gaier (1970) found that the creative person possesses an individualistic rather than a sociocentric personality. He is not preoccupied with opinions others have of him and so is free to be himself and realize his potential.

Rogers (1951; 1959a; 1961) attempted to conceptualize the human personality. The following are the major assumptions of his theory. First, Rogers believes that what is crucial in terms of understanding a person's behaviour is neither the circumstances surrounding the person's life nor the events in which he participates; what is most important is how the person perceives these circumstances and events. Secondly, for Rogers, every person has an inborn tendency toward self-actualization. Third, each person engages in an organismic valuing process. Experience is valued as positive or negative by reference to the actualizing tendency. The individual tends to approach positively valued experiences and to avoid negatively valued experiences.

Self-actualization, as defined by Rogers, includes not only the satisfaction of biological needs and the learning for skills necessary for physical and social survival, but also development toward autonomy, independence, and a growing sense of self-determination. Self-actualization is Rogers' motivational construct, the single goal towards which all persons strive.

Rogers' definition of self-actualization is somewhat general in nature. How, then, does one know whether or not a particular behaviour is actualizing for an individual? In answering this question, Rogers suggests that the person himself determines whether or not a given behaviour is good for him on the basis of the feelings he experiences when contemplating or actually engaging in that behaviour. If the person perceives an experience as one which maintains or enhances life, that experience is valued positively. If he perceives an experience as negating such maintenance or enhancement, he is said to engage in an organismic valuing process. As mentioned above, Rogers

suggests that individuals will continue to engage in positively valued behaviours and avoid those behaviours which are valued negatively. It is assumed that, given little or no interference from other people or environmental pressures, each person is naturally capable of making correct decisions concerning what is best for him.

Rogers' process theory focused strongly on the broad general processes involved in psychotherapy and adjustment. It allows for the description of individual differences only in very general terms and only for a few variables. This, however, is what he set out to do. He achieved it by assuming for everyone a strong, inborn, positive motivation which will make for creative behaviour and freedom from serious internal conflict, but which is inhibited by nonconstructive experiences. Psychotherapy is a process which releases this inhibited force and allows the person to self-actualize. Whether or not his assumptions are valid or his process theory for enhancing positive growth correct or useful will only be determined when ways are developed of measuring his constructs more satisfactorily.

Perhaps more than any other researcher, Rogers (1959b) stressed the importance of internality to the creative process. Rogers outlined three inner conditions necessary for constructive creativity: an openness to experience, an internal locus of evaluation and an ability to toy with elements and concepts. In reference to an internal locus of evaluation, Rogers stated:

> Perhaps the most fundamental condition of creativity is that the source of evaluative judgment is internal. The value of the product is ... established not by the praise or criticism of others, but by himself. Have I created something satisfying to me? ... These are the only questions which really matter to the creative person.
> (p.144)

Furthermore, Rogers (1959b) described psychological safety and psychological freedom as the two external conditions fostering creativity. Rogers reported that psychological safety can be achieved through the creation of a climate in which external evaluation is absent.

> Evaluation is always a threat, always creates a need for defensiveness, always means that some portions of experience must be denied to awareness. If judgment based on external standards are not being made then I can be more open to my experience ... to the nature of the material and of my reactions to them, more sharply and more sensitively. I can begin to recognize the locus of evaluation within myself. Hence, I am moving toward creativity.
>
> (p.147)

In short, Rogers has said that an internal locus of control is a primary and necessary condition of creativity and that internality (and hence, creativity) can be nurtured and developed through the provision of an environment in which external evaluation is absent.

The development of the Rotter I-E Control has led to empirical investigation of this construct, and it is the aim of the present research to examine its relationship with students' creativity. Rotter (1966) has proposed the locus of control construct as a broad personality disposition, with many cognitive, motivational and behavioural concomitants which, in turn, will influence people's interactions with the environment. Individuals' behaviour will vary according to their locus of control orientation. Internals may be more disposed to independence and so respond confidently to creativity tests. Externals may be more concerned with the influence of others and so respond less independently and confidently to these tests. The source of control determines the nature and quality of people's performance on creativity measures. In the following section a number

of studies will be discussed which have investigated the relationship between creativity and the locus of control.

Poole, Williams and Lett (1977) administered the Torrance Tests of Creative Thinking and the Miller Locus of Control Scale to a sample of 1,000 urban sixth-grade children. Four per cent of the students were identified as highly creative and a similar percentage were chosen as a control group (the control group scores approximated the general population mean). Significant differences on locus of control scores were found between the highly creative group ($M = 16.2$) and the control group ($M = 11.1$, $t = 5.25$, $p < 0.01$). Although the results appeared supportive of a relationship between creativity and internality, the authors identified certain limitations in their study. The reliability of the classification procedure for identifying creative individuals was questioned and it was concluded that future research should use creative products and other behavioural measures as well as creativity tests in selecting creative persons.

Tetenbaum and Houtz (1978) carried out research which involved 127 highly gifted children, boys and girls, who were in grades four to six in a school for gifted children. The average IQ of these elementary children was 139.25, with a standard deviation of 14.20. No significant difference in IQ between the sexes was noted. The purpose of this study was to investigate the relationship between affective traits, which included locus of control, self-esteem and tolerance of ambiguity, with cognitive traits, which comprised problem-solving and creativity. This relationship was examined in order to determine the interaction between these two sets of variables, something not considered before. Previous research had been more concerned with describing creative adults than potentially creative children in a

school setting.

The cognitive measures consisted of associational, word, ideational, expressional fluency, spontaneous flexibility, adaptive flexibility, numerical reasoning and verbal rearrangement. The affective measures included the Bialer-Cromwell Locus of Control Scale, the Coopersmith Self-Esteem Inventory (a shortened 25-item) and the Rydell-Rosen AT20 (the items were rewritten to suit elementary children). Factor analysis of the cognitive measures yielded two factors: Fluency and Rearrangement. The scores on these two factors were examined by analysis of variance in order to test grade and sex differences.

The results showed that on the fluency factor the girls scored significantly higher than the boys. When the differences between grades and the interaction between sex and grade were examined, the analysis revealed no significant differences on this factor (fluency). In respect of the rearrangement factor the boys did significantly better than the girls. In addition, a significant main effect for grade was found: grade four children differed significantly from grade six children. However, the study found that the interaction between sex and grade was non-significant.

With regard to the affective measures, no significant sex differences were found. Grade differences were noted on the variable of tolerance of ambiguity alone. Finally, when the canonical correlation analysis was employed, one significant canonical set ($p < .05$) was obtained in which 46% of the variability in a set of cognitive measures was explained by a set of affective measures. The canonical correlation was 0.675 and the squared canonical correlation was 0.456.

The above-mentioned study showed that discovering the nature of the interaction between cognitive and affective characteristics is important if we are to understand creative people. Understanding of such interaction implies also a recognition of the need to develop an adequate curriculum and methods of teaching in order to develop creative thinking abilities in children. Tetenbaum and Houtz (1978), summarizing their findings, state that

> the results of the present study do demonstrate the importance of taking into account affective characteristics when one is evaluating the cognitive skills of problem-solving and creativity. The fact that locus of control and tolerance of ambiguity shared 46% of the variance with several creative and problem-solving tasks suggests that perhaps curricular experiences designed to increase internality and tolerance of ambiguity should be included with teachers' attempts to increase creative problem-solving.
>
> (p.31)

There are, however, some observations to be made in connection with the study of Tetenbaum and Houtz. Firstly, when these researchers tested the nature of the relationships between the two sets of variables included in the study by correlating each of the original variables with the first canonical variate, the relationships were not as clear as they expected. Secondly, the sample comprised only highly intelligent primary children, and because of this the results obtained are valid only for this particular group. An investigation of the interaction between cognitive and affective traits in children of different intellectual abilities may yield interesting results. Again, this sort of interaction also should be examined with different age groups, and samples should be selected on the basis of an adequate criterion of creativity. Finally, the reliability coefficients of the measures were only moderate, and may therefore have contributed to the obtaining of non-comprehensive results.

In a study by Gavurin and Murgatroyd (1973), 34 male and 80 female undergraduates were tested on an anagrams test and Rotter's I-E Scale. A significant negative correlation of -0.22 ($p < 0.025$) was obtained between task performance and the I-E score for females. However, the correlation of -0.16 for males was not significant. The authors attributed this finding to the fact that on the I-E Scale the mean for males was significantly lower than that for females ($t = 2.90$, p 0.01) and that relatively few highly externally controlled individuals were male. Consequently, the males did not appear to provide the range of I-E values necessary for significance.

Houtz et al. (1980), employing elaborate methods, studied the relationship between cognitive and affective traits in a sample of 80 intellectually gifted four-to-six-grade boys and girls. These children, who were in a school for gifted children, were given divergent thinking and problem-solving tasks (cognitive measures), and measures of tolerance for ambiguity, locus of control and self-esteem (affective measures). On the basis of intelligence and fluency scores, the sample was divided into four groups as follows: (1) higher fluency/higher IQ; (2) higher fluency/lower IQ; (3) lower fluency/higher IQ; and (4) lower fluency/lower IQ.

The children's scores on either the WISC or the Stanford-Binet intelligence tests were recorded in the school and ranged from 106 to 170. Children above IQ 139 were designated as higher intelligence and those who had IQ equal or below 139 were designated as lower intelligence. Divergent thinking was evaluated by ten tests measuring ideational fluency in a variety of settings; problem-solving was assessed by the verbal maze task. Children who scored more than the average (6.11) on the fluency tests were designated higher fluency and

those children scoring average or less than average on these tests were designated lower fluency. The personality measures involved a children's version of the Rydell-Rosen Tolerance of Ambiguity Scale, the Bialer-Cromwell Children's Locus of Control Scale, and the Coopersmith Self-Esteem Inventory.

The dependent variables in the analysis of variance technique were problem solving, tolerance of ambiguity, locus of control and self-esteem. Significant fluency effects for problem solving, tolerance of ambiguity, locus of control and self-esteem were found. The results also indicated a significant main effect for intelligence on tolerance of ambiguity scores, and a significant interaction of intelligence and fluency on self-esteem scores was also noted. Using post hoc comparisons to test the interaction, group three (lower fluency/higher IQ) was found to be significantly lower in self-esteem than the other three groups. The higher fluency group was more tolerant of ambiguity, internally oriented and higher in self-esteem. Higher intelligent children were more tolerant of ambiguity than lower intelligent children. Finally, analyses of variance showed that the higher intelligence level group obtained the greater achievement test scores.

The most important findings in the above-mentioned study where that the higher fluency children were found to be more tolerant of ambiguity, more internal regarding their locus of control, higher in self-esteem and better problem solvers and school achievers. This finding provides evidence for the association between cognitive and affective traits related to creative behaviour. However, the small number making up the sample (N = 80) can be considered as a weakness in the design of this study. The results seem to be confined to this

particular group of highly gifted children. In addition, the study considered one factor only of creative thinking, which was fluency. Although fluency is significant in creative productivity, the contribution of other creativity factors, such as originality, flexibility and elaboration, is essential too. Thus, this study should have incorporated these factors into its investigation of the relationship between cognitive and affective traits related to creative thinking. By doing this more conclusive reslults could have been established.

Houtz and Coll (1979) investigated the interaction effect of instructions and locus of control on ideational fluency. They reported that most previous research in this area had examined the relationships between cognitive and affective traits through the employment of correlation coefficients. Low to moderate correlations were found between these two aspects. This only suggested some general trends, whereas the interaction between personality characteristics and ideational fluency during the creative thinking process had not been considered in the examination of this relationship. The main concern of Houtz and Coll, therefore, was to examine the effect of the interaction between the locus of control orientation (internal or external) and the type of instructions the sample received (i.e. to be original or not to be original) upon idea production. Their study postulated that if instructions were consistent with subjects' locus of control orientation, ideas production would increase, whereas if instructions were not compatible with the locus of control, subjects would have difficulty in generating ideas:

> Subjects with an Internal Locus of Control who were told to think of ideas that other subjects would also think of would have some difficulty because the primary source of evaluation for Internals is themselves, not others. By the same token, those with an External Locus of Control Orientation who were told to think of only those ideas that no-one else would think of would have difficulty because the primary source of idea evaluation for Externals is others.
>
> (p.50)

Houtz and Coll's sample comprised 107 students (53 male and 54 female), who were in a liberal arts institution. Their ages ranged from 18 to 33 and their average grade-point-ratio was 2.89 out of a possible 4.00. The following materials were included in this study:

(a) A demographic questionnaire;

(b) Two divergent thinking exercises: 1) What would be the consequence of having an extra thumb on each hand? and 2) What would be the consequences of having the power to read minds?;

(c) Two sets of instructions for the application of the divergent thinking tasks (Common and Unique Instructions);

(d) Self-rating forms for the assessment of how creative the students' responses were;

(e) The Rotter Locus of Control scale.

The two divergent thinking tasks were scored for ideational fluency. Ideational fluency was defined in terms of the number of relevant ideas produced by a subject while working on these tasks. The researchers had studied the factor of ideational fluency because previous research had proven that this factor was independent of intelligence and because it had been found to be significantly related to creativity. On the basis of the Rotter scores students were divided into Externals or Internals. The External Group included students who

scored 13 or more. The Internal Group involved students who had 11 or less.

The results indicated correlations of -0.10 to 0.00 between grade-point-ratios, as a general achievement measure, and the number of ideas generated on the divergent thinking tasks as well as the creativity self-ratings. This result implies that ideational fluency is independent of achievement. It is also consistent with previous findings (e.g. Wallach, 1970). Many other studies of creativity measurement showed moderately positive correlations between scores on achievement and intelligence tests. Also, a significant relationship ($p < .01$) was found between performance in ideational fluency tasks and student self-ratings; the correlations ranged from 0.28 to 0.50. The correlations between the two self-ratings ($r = 0.59$) and between the two fluency tasks ($r = 0.62$) were also significant ($p < 0.01$).

Analysis of variance showed non-significant main effects for either instructions or locus of control. Previous research suggested that instructions to produce either common or original ideas can affect idea generation. In this research (Houtz and Coll, 1979), on the other hand, a trait-treatment interaction was observed in which the affective and cognitive aspects of the creative thinking process appeared to reinforce or complement one another. Also, self-ratings of creativity were not affected by instructions, locus of control, or any interaction effects.

The results of Houtz and Coll (1979), however, showed a significant interaction on the second fluency task, 'read-minds' ($F(1.94) = 7.75$, $p < 0.05$). Newman-Keuls post hoc tests showed that externals given instructions to produce common ideas and internals given instructions to generate unique ideas scored more highly than

externals given instructions to generate unique ideas and internals given instructions to produce common ones ($p < 0.05$). This finding was explained by the fact that the students answered the first fluency task, 'thumbs', before this task. Thus, students were given some time and opportunity to practice before the effects of the different instructions influenced performance.

The above-mentioned results do suggest that more research is needed to investigate the creative process in a more dynamic, interactive way in order to understand adequately the interaction between affective and cognitive traits in the creative process. It appeared that the two divergent thinking questions were not appropriate for the evaluation of creativity. Studies aiming to investigate this interaction must offer a real opportunity to subjects to produce original thoughts. Factors such as time, instructions and accurate criteria of creativity must be considered very carefully before any attempt is made to undertake research in this area.

Aggarwal and Verma (1977) carried out a study wherein a comparison was made between high and low creative students on internal-external control. This investigation was carried out in selected high schools in the district of Jammu in India. The results showed that the high creative students were significantly more internal than the low creatives.

Brecher and Denmark (1969) related locus of control to verbal fluency. Eighty-four college students were administered a modified version of Thurstone's Word Fluency Test as well as Rotter's I-E scale. As hypothesized, the mean fluency score of internals ($M = 15.67$) was significantly higher than that of externals ($M = 13.00$) for each minute of work ($F = 4.22$ $p < 0.05$). The researchers concluded that

individuals with high internal scores were able to write a significantly greater number of words within the allotted time than externals. They also reported:

> The present result might be interpreted as indicating that the degree of reinforcement for verbal behaviour is one of the significant antecedent factors related to locus of control orientation. (p.709)

It should be noted, however, that the difference between the mean scores of the internals and the externals on the fluency test was only 2.67 words. It may have been the homogeneity of the sample that led to there having been such a small difference. This underlines the necessity for using samples of secondary school students and pre-school children in order to investigate the relationship between fluency ability and the locus of control orientation. Subjects of both sexes should be included in these samples. Different forms of fluency should be considered, too.

Bolen and Torrance (1978) carried out a study wherein the influence on creative functioning of locus of control, co-operation and sex was examined. The researchers stated that creative personality research showed that creative people were more spontaneous and energetic, preferred variety and change, and were less conformist. These attributes suggested that these people are more confident and independent than their less creative counterparts, and so it is possible that creative people differ in other fundamental personality dimensions. Externally oriented people were lacking insight, self-confidence and social approval. By contrast, internally oriented people were found to have a tendency to assume control while externals adopted a more passive role. Another factor found to distinguish internals from externals was that the performance (quality and quantity) of internals in skilled tasks was better than the

performance of externals. Also, the performance of internals working individually on open-ended or ambiguous tasks was better than the performance of the externals.

Bolen and Torrance (1978) write:

> Personality correlates between internality and creativity seem to assume some basic overlap. Research results on internal-external control indicate that internals are those who assume an active role in problem-solving situations, who give suggestions and opinions and are less likely to depend on others ... A review of the relevant literature does not indicate any consistent relationships between sex and creativity measures or between sex and I-E.
>
> (pp. 903-4)

These researchers administered the Rotter I-E Scale and the Unusual Uses test of creativity from the Torrance battery, Verbal Form B, to 312 (158 male and 154 female) junior college students, whose ages ranged from 17 to 56 years. The Scholastic Aptitude Test scores (verbal and quantitative) and college grade-point average of these students were considered. The females were significantly higher in grade-point average than the males. All other comparisons (dyad - non-dyads, I-E levels and sex) were not significant.

On the basis of the Rotter I-E scale scores, the students were classified into three groups as follows: Group 1, 'internal locus of control' (N = 105); Group 2, 'mixed locus of control' (N = 119); and Group 3, 'external locus of control' (N = 88). One half of each group was selected randomly to the dyad condition (N = 158). Each dyad was paired randomly to sex and locus of control, which made a total of 12 study groups. The number of students in each cell ranged from 16 to 34. Creative thinking was operationally defined in terms of scores on the Unusual Uses test.

Using a multivariate analysis of variance, the results showed that all main effects were significant beyond the 0.02 level. The

findings of the one-way univariate analyses revealed that the dyads were significantly more flexible and original than the non-dyads; there were no significant differences between the three groups, and males were significantly more flexible than females in creative thinking. Bolen and Torrance conclude:

> Success in creative functioning, as measured by a divergent problem-solving task, appears to be influenced by certain factors. Co-operation in the form of dyadic interaction results in greater originality and variety of ideas produced. Externals seem to be more active seekers and users of information on divergent tasks than internals, and males seem to be more flexible than females whether they are working individually or in dyads.
>
> (p. 906)

Contrary to theoretical formulations which imply that internality is related to creativity, the above-mentioned study indicated that the external students were more creative than the internal or mixed locus of control students. Also, empirical findings mentioned above showed that internal locus of control was correlated with creativity.

Bolen and Torrance, explaining the high performance of the externals on the creativity test, write:

> It appears that previous studies that reported results in favour of internals involved single dimensions of measurement and test task and focused the S's perceived expectancy on producing a correct answer from known information. On these convergent tasks the internals were able to perform at a higher level than were externals.
>
> (p. 906)

They measured creativity using only one test, however, and their findings therefore would appear to be inconclusive.

MacGregor (1964) examined the relationship between originality, grade, sex, intelligence and role perception in children. Role perception was defined thus:

> If an individual perceives his role in life as an active, controlling one and if he appears to have an internalized

> set of standards by which to judge events in life, he is described as having an internalized role perception. If, on the other hand, he feels that events in life are beyond his control and that he must rely on the judgments of others, he is described as having an externalized role perception.
>
> (p.10)

Role perception was measured in terms of locus of evaluation and locus of control.

The following hypotheses were tested by MacGregor. Firstly, it was assumed that children with an internal locus of evaluation and an internal locus of control will score significantly higher on a measure of originality than children with an external locus of evaluation and external locus of control. Secondly, it was expected that children who had an external locus of evaluation and an internal locus of control would not score significantly higher on the originality measure than children who had an internal locus of evaluation and an external locus of control. Thirdly, it was hypothesized that eighth grade children will score higher on the measure of originality than sixth grade children, who in turn will score higher than fourth grade children. No predictions were made as to sex differences on the originality factor, since it was an exploratory area.

MacGregor's sample involved children who were in fourth, sixth and eighth grades in public schools. The students were predominantly from middle-class families. Their intelligence scores, as measured by the California Mental Maturity Test, were available in the schools' records. These scores were used to select those children with an intelligence quotient of 120 or higher. Students who were below IQ 120 or not within the normal chronological age for each grade were not used in the research. A total of 312 children (boys and girls) met the criteria of intelligence and age.

The following tests were given to the sample:

(1) Children's Locus of Evaluation-Control Scale - devised by J. Miller.

(2) Four tasks selected from the Torrance Tests of Creative Thinking: (a) Product Improvement (verbal); (b) Unusual Uses (verbal); (c) Figure Completion (non-verbal); and (d) Circles (non-verbal).

The data was analysed using correlation technique and a three-dimensional factorial analysis of variance. Using the first method the correlation of each variable was computed with every other variable for the total sample (N = 312). By means of the second, the total originality score of 126 students who were classified on the basis of grade, sex and role perception was tested. Using the Locus of Evaluation (LE) and the Locus of Control (LC) means, MacGregor divided the students (N = 312) into three groups. These consisted of a group with an internalized role perception (ILE-ILC), a group with an externalized role perception (ELE-ELC) and a group composed of ILE-ELC and ELE-ILC subjects, which was referred to as the mixed group.

The results showed that the girls scored higher than the boys on the originality measures. Older students did better than younger ones on these measures. Also, students with higher locus of control scores performed better than students with lower locus of control scores on these measures. When the effects of sex and grade were removed, using the partial correlation technique, the correlation between the variables of locus of control and originality was non-significant.

variables of locus of control and originality was non-significant. With the locus of evaluation measure no significant correlation between this measure and originality was found. But the locus of evaluation significantly correlated in the negative direction with sex. This meant that boys had higher locus of evaluation scores than girls. Again, when the partial correlation was used to assess the relationship between originality and locus of evaluation, no significant correlation was obtained. From these results it seemed that only sex and grade were consistently related to the total originality score for the whole group.

The analysis of variance in three dimensions was used employing the total originality scores for students (N = 126) who were categorized by grade, sex, and locus of control and locus of evaluation scores (three groups). It was found that the ILE-ILC group performed significantly better on the originality tasks than the ELE-ELC group. Also the ILE-ILC group performed significantly better than the mixed group. The differences between the mixed group and the ELE-ELC group were not significant. Children in grade eight performed significantly better than grade six and grade four children. Children in grade six performed significantly better than children in grade four. Finally, girls performed significantly better than boys.

On the basis of the above-mentioned results, MacGregor concluded:

> If it is true that an internalized role perception is important for the development of creative production, then children in school, as well as at home, must be given opportunities for the development of an internalized standard of judgment and for the development of some feeling of effectiveness in controlling events in their own lives. A child may be endowed by heredity with a remarkable body which will not develop properly without an adequate diet. Similarly, a child may be endowed with marked creative aptitude, but without some belief in himself, this aptitude may never be realized.
>
> (p.112)

With respect to MacGregor's research we should note that the sample included high intelligent children (IQ 120+). We may then ask if the nature of the relationships between the tested variables will vary in samples involving mixed abilities. MacGregor's study used the TTCT as the originality criterion and this may cast doubt on her findings.

Glover and Sautter (1976) investigated the relationship between creative thinking abilities and the locus of control. Their study was designed to determine whether internal locus of control students differ from external locus of control students in terms of their performance on creativity measures. The sample comprised 168 first-year graduates (90 female and 78 male) who were in the Department of Psychology. Their ages ranged from 22 years 3 months to 51 years 8 months, with a mean of 27.5 years. The following two tests were administered to these students: (1) The Unusual Uses subtest of the TTCT; (2) The Rotter I-E scale.

The median score for the Rotter I-E scale was employed to classify students into internals and externals. The students whose scores exceeded the median were designated externals. Those scoring below the median were termed internals. In the data analysis this grouping was the independent variable, while the creativity measures (fluency, flexibility, elaboration and originality) were the dependent variables. Internal and external groups were then compared on each of the creativity measures.

The analysis indicated that the internally oriented group scored significantly higher than the external group on the measures of flexibility and originality. However, the external group scored significantly higher than the internal group on the elaboration

factor. No significant differences on the fluency measure between the two groups were found. Regarding this finding, the researchers mentioned that previous findings had shown that performances on the fluency and elaboration subtests were usually highly negatively correlated. The relationship between these two factors in the present study was explained by stating that

> it is apparent that when subjects are separated by the internality-externality measure the relationship of high fluency-low elaboration does not hold for the external individuals, who were as fluent as the internals but far more elaborate. Indeed, while there were no significant differences between the internals and the externals on the fluency measure, the externals scored significantly higher on the elaboration measure.
>
> (p.259)

This correlation was further supported by the establishment of a correlation between the scores for the two factors, elaboration and fluency. For the external group the correlation was +0.21. For the internal group the correlation was -0.61. In this study, then, it seemed that the factor of elaboration was a function of internality-externality.

It is not surprising that the internal group surpassed the external group on the creative abilities of flexibility and originality. We may expect internally oriented subjects to be less concerned with external evaluation of their ideas than externally oriented subjects. They are therefore more likely to produce original ideas in a variety of forms than externally oriented subjects, who respond in a traditional way which is reinforced, so to speak, by the behaviour of powerful others in the past. Glover and Sautter pointed out:

> The fact that there are differences between internally and externally controlled individuals in terms of their relative levels of creative abilities may indicate that the concept of reinforcement expectancy and locus of control are critical variables in the identification and operationalization of those personality characteristics indicative of creative behaviour. The fact that persons perceive reinforcement as being contingent upon their own behaviour may well increase the probabilities of their learning those new and unique modes of responding that are characteristic of creative individuals.
>
> (p.260)

Again, the problem here is that Glover and Sautter employed only a subtest of the TTCT as a means of measuring creative thinking. In such research in discovering the relationship between a personality variable (I-E Control dimension) and creative thinking, an accurate procedure of assessment should be employed so as to make sure that the variables are carefully measured. In this case, one may feel confident about the conclusions arrived at, as the variables were accurately measured.

Churchill (1976) carried out research in which the relationship between creativity and the locus of control was investigated using a sample of junior high school students. The study included an experimental group and a control group. The experimental group consisted of 63 students who were randomly selected from 800 students who had received a Title I educational programme. The control group involved 61 students who were randomly selected from a comparable group of 400 students who did not receive the Title I programme. These students (N = 1,200) were pre- and post-tested on the following measures: (1) The Mednick Remote Association Test (RAT); (2) An imaginative story written by the students in response to an ambiguous pictorial cue; (3) The Nowicki-Strickland Personal Reaction Survey (NSPRS).

Churchill hypothesized that creativity and internal locus of

control are positively correlated. Also, he hypothesized that an intervention consisting in part of creativity training would result in parallel gains in creativity and internal orientation for the experimental group. Significant gains in these variables were expected to further validate the correlation.

These two hypotheses were supported by the preliminary results. A correlation was established between creativity and moderate internality. Through use of the t-test it was found that the experimental group performed significantly better than the control group at post-retesting on the three tests. The experimental group gained significantly from pre-testing to post-testing on the study's measures. For the control group it was indicated that the Creative Story and the NSPRS had significant losses. The RAT, however, showed significant gains at the 0.05 level. On the basis of these results Churchill (1976) reports:

> Although conclusions about the relationship between creativity and internality must be tentative until a complete analysis of the data has been performed, it is of particular importance at this point to note that gains in the experimental group occurred on the two measures of creativity and in the direction of internality on the measure of locus of control.
>
> (p.11)

In connection with the measurement of creativity, Churchill used two tests for this purpose. One of these was the Mednick Remote Association Test (RAT). In fact, previous research cited above had indicated that this test was not an appropriate criterion for creativity assessment. This point should be considered in view of Churchill's findings.

Lefcourt and Telegdi (1971) examined the differences in cognitive activity between internal and external persons and the relationship between the locus of control and the field-dependence dimension. These

researchers employed both locus of control and the rod and frame measurement of the field-dependence in an attempt to predict scores on measures reflecting cognitive activity. The sample in this study consisted of 90 male university students. The dependent measures included performance on Mednick's Remote Associates Test, Barron's Human Movement Threshold Inkblot Test, and an incomplete sentences test. The constructs of locus of control and field-dependence were treated as the independent variables. It was postulated that internal-field-independent persons would perform better than external-field-dependent persons on measures of cognitive activity (Mednick's and Barron's tests) and measures of general verbal productivity (Barron's and the incomplete sentences test). Also, it was expected that the incongruent groups (internal-field-dependent and external-field-independent) would perform in these tests at an intermediate position relative to the other two groups. The results indicated that the subjects of the internal-field-independent group scored more highly than all other groups on every test. This finding was anticipated in the study's hypothesis. However, the external-field-dependent group came second (and the incongruent groups scored the poorest) in its performance on each measure. The data proved that neither the locus of control nor the field-dependence dimension alone yielded a significant main effect in the prediction of cognitive activity. But when these two variables (locus of control and field-dependence) were combined, the analysis of data showed significant findings. The internal-field-independent group performed on the tests as the researchers expected. Lefcourt and Telegdi (1971) therefore stated that

> as hypothesized, internal- field-independent Ss do seem to be the most cognitively active among the four groups,

> which may help to account for the greater awareness of opportunities and readiness to perceive relevant information previously noted among internal samples. In addition, the added power of obtaining field-dependence measures along with locus of control scores supports a contention ... regarding the potential value of combining these empirically unrelated but theoretically relevant variables into a battery of tests for predicting independence-related behaviour.
>
> (pp.55-6)

The high performance, in Lefcourt and Telegdi's study, of the internal-field-independent subjects on Mednick's Remote Associates Test, used by researchers to assess creative thinking, might support the theory that there is a link between internality and creativity. Although it has been mentioned that the RAT has been attacked as being not adequate for measuring creativity, the high performance of the internal-field-independent subjects on both Barron's and the incomplete sentences tests might lend some support to this theory.

Johnson and Kilmann (1975) examined the relationship between locus of control and perceived confidence in problem solving abilities. Twenty male internals, 20 female internals, 20 male externals and 20 female externals were given Rotter's I-E Scale of Perceived Problem Solving Abilities, developed by the researchers. The scale was pilot-tested with a sample of 142 college students. Analysis of variance revealed a significant interaction for sex by locus of control ($F = 7.49$, $p < 0.01$). Internal males rated themselves as more confident than external males. The researchers suggested that failure to find significance among females may reflect a cultural bias, i.e. that females are not expected to do as well as males on problem solving tasks.

Although Johnson and Kilmann found that internal locus of control males were more confident than external locus of control males, the small size of the sample makes it impossible to establish generalized

findings. The study used a self-rating scale. This technique was perhaps not very accurate in measuring the variable of confidence in problem solving ability.

DuCette, Wolk, and Friedman (1972) studied the relationship between locus of control and creativity in a population of black and white boys of school age. The subjects consisted of 40 lower-class boys between the ages of 9 and 11, equally divided between blacks and whites. All the subjects were administered Crandall's Intellectual Achievement Responsibility Questionnaire and the Pattern Meanings Test developed by Wallach and Kogan. The creativity test produced three scores: fluency, the total number of responses emitted; creativity, the uniqueness of these responses; and creative efficiency, a ratio produced by dividing fluency by creativity. The locus of control scores for the sample were ranked, and a median split was made. This resulted in the following four groups: white internals, n = 11; black internals, n = 8; white externals, n = 9; and black externals, n = 12.

Three two-way analyses of variance (Race by Locus of Control) were performed. The results showed that for the dependent variable of fluency, neither main effects nor the interaction were significant. An analysis of creativity and creative efficiency scores, however, indicated in both cases a significant effect for Locus of Control ($p < .01$). As predicted, internals gave more creative responses than externals and were more efficient. Neither Race nor the interactions were significant for either of these dependent variables. The researchers reported that the study would seem to contribute to the development of locus of control theory, as well as suggest the circumstances under which social factors can moderate the predictions made by this theory. In demonstrating greater creativity and a

heightened ability to manifest such creativity concisely, the internal S seems to be a more active seeker and user of information than his external counterpart. The data would also seem to argue for an invariant relationship between locus of control and creativity across social milieux. It was recommended that further research be conducted in order to examine the relationship between expectancy for control and information utilization strategies in various environments with a wider range of dependent variables.

The study of Lotsof and Steinke (1973) examined the I-E control, divergent thinking and levels of abstractness in junior high school students. All seventh, eighth and ninth grade students (n = 90) from a University Junior High School were administered the Rotter I-E scale, the Guilford's Unusual Uses test, and a sorting task judged for level of abstractness. It was hypothesized that internal Ss would emit more uncommon responses than Ss scoring in the median range and that Ss scoring high on the scale (externals) would produce the fewest uncommon responses. Also, the study assumed that internal Ss would give more abstract responses than external Ss and that Ss with median scores on the scale would score between extreme I-E groups on this level of abstractness test. The results indicated that there were no relationships between the locus of control scores and measures either of uncommonness or of levels of abstractness of response.

Cohen and Oden (1974) carried out a study in which the relationship between creativity and locus of control in children was examined. The sample involved 130 boys and girls (61 kindergarten and 69 second grade children) who were attending elementary school. These children were of normal intelligence. The locus of control was measured by a test adapted from one used by Bialer, and creativity was

examined by two tests (Instances and Uses) adapted from Wallach and Kogan's battery of creativity. The creativity tests were independently scored for fluency, uniqueness and flexibility. Each child was individually tested by a female examiner.

The analysis of scores of combined grades indicated significant interactions between internal locus of control and creativity as measured by the Instances test for boys and girls ($r = 0.21$, $p < 0.05$; $r = 0.33$, $p < 0.01$, respectively). Also, the analysis showed that among second grade girls creativity performance, as measured by the Instances test, was significantly correlated with locus of control scores ($r = 0.43$, $p < .01$) By contrast, among kindergarten boys locus of control scores were negatively correlated with creativity as assessed by the Uses test ($r = 0.36$, $p < 0.05$). These results were explained in terms of sex and age differences.

The study of Beck (1979) was designed to test the effects of locus of control orientation (as identified by internal, powerful others, and chance orientations) and environmental cues (as identified by type of task instructions) upon creative problem solving skills. The performance of community college students on two types of tasks was studied using differing sets of instructions. Persons with internal, powerful others, and chance orientations were compared on an ideational fluency task where all subjects received instructions emphasizing the role of chance. The same subjects were compared on a conceptual foresight task, where a random half received instructions emphasizing the role of skill and minimizing the threat of external evaluation, and the other half received instructions emphasizing the role of skill and maximizing the threat of external evaluation.

Beck's sample consisted of 178 (male and female) undergraduate

freshmen in 12 sections of English Composition classes. The testing procedure took approximately 40 minutes. Levenson's Locus of Control Scales and two experimental problem solving tasks designed by Guilford and his associates, Partiment Questions (a measure of conceptual foresight), and Utility Test (a measure of ideational fluency), were administered to all subjects.

The Powerful Others and Chance Scales were moderately positively correlated, indicating that both scales tap related areas of locus of control (i.e. externality). Similarly, the two dependent measures were significantly correlated, indicating that the experimental tasks measure related areas of creative problem solving. Tests for sex differences on conceptual foresight and ideational fluency were non-significant.

As expected, chance instructions minimized the relationship between locus of control orientation and creative problem solving. Results of a one-way analysis of variance revealed non-significant differences in creative problem solving performance among individuals differing in locus of control orientation. By contrast, significant differences in creative problem solving were found under skill instructions. Results of a two-way analysis of variance showed a main effect for locus of control. Furthermore, a statistically significant interaction effect (at the 0.07 level) was also obtained, demonstrating that the experimental manipulation of evaluation differentially affected the problem solving ability of individuals with various locus of control orientations. Those with powerful others orientation appeared to be the most influenced by the degree of evaluation present in task instructions.

Under evaluative instructions, the mean for those with powerful

others orientation was lower than the mean for internal subjects but higher than the mean for chance-oriented subjects. Under non-evaluative instructions, however, the mean for powerful others subjects surpassed the mean for both internal and chance-oriented subjects.

The major contribution made by Beck's research was the establishing that one way to study the relationship of locus of control with creative problem solving is within a person-by-situation framework - that task instructions will moderate the effects of locus of control on creative problem solving. The findings of the study were generally supportive. However, in the light of the paucity of research in this area and the support of interaction effects (at the 0.07 level) it was recommended that further studies should be undertaken in order to arrive at comprehensive results.

Conclusion

The above survey of research on the locus of control construct has indicated that a large number of studies have been conducted to examine its relationship with a wide range of dependent variables, for example intelligence, achievement, ethnic group and social class, adjustment and cognitive activity. However, few studies have been carried out with the aim of examining its relationship with creativity. Thus the main purpose of the present study is to investigate the relationship between the control construct and creativity in a sample of Egyptian preparatory school children. Some other relationships were also investigated. The present research examined the following hypotheses:

(1) That there would be a significant relationship between

creativity (as measured by the GIFFI I inventory and the teachers' ratings) and internal control (as measured by the Nowicki-Strickland test).

(2) That there would be significant sex differences on the creativity measures (the GIFFI I inventory and the teachers' ratings) and the locus of control (as measured by the Nowicki-Strickland test).

(3) That there would be a significant relationship between intelligence (as measured by the Pictorial Intelligence test) and creativity (as measured by the GIFFI I inventory and the teachers' ratings).

(4) That there would be a significant correlation between internal control (as measured by the Nowicki-Strickland test) and intelligence (as measured by the Pictorial Intelligence test).

(5) That the concept of the ideal pupil held by a group of Egyptian teachers (as measured by the Ideal Pupil check-list) would not be consistent with that of experts on the creative personality.

Chapter Six

Further Issues Relating to Creativity

Introduction

This chapter is concerned with four important issues relating to creative thinking. First, it discusses what is meant by creativity and how creativity is measured, then moves on to identify the the present researcher's approach to defining creativity in the sample of Egyptian preparatory school pupils. Secondly, the chapter presents and critically analyses research dealing with the relationship between creativity and intelligence. Thirdly, it discusses the influence of cultural factors on creative development. This discussion deals with the factors affecting the development of creative thinking in society in general, and the factors affecting its development in school children in particular. The present researcher believes that determining what such factors are is essential for creating a school atmosphere conducive to the development of this ability in students. Finally, the role of education in identifying and encouraging creatively gifted children is carefully considered. The conclusion refers to the criteria of creativity employed in this research and suggests how creativity in Egyptian schoolchildren can be stimulated and enhanced.

Definition and Measurement of Creativity

One of the major problems in the area of creativity research is the definition of such a complex phenomenon. Evidently we cannot deal scientifically with the concept unless we adequately conceptualize what is meant by it. A variety of definitions have been introduced. Most of them are vague, however, and thus impossible to employ in empirical research. What we need is an operational definition which enables us to measure creative thinking. Freeman, Butcher and Christie

(1968) refer to the problem of establishing an accepted definition of creativity when they write that

> this concept as commonly employed is amorphous and indefinite; its relationship with longer established concepts in education and psychology is vague and loose and its use by both educators and psychologists highly individualistic. Current views on the nature of creativity differ widely and cannot easily be separated from views on intelligence and intelligence testing, the measurement of special aptitudes and abilities, learning theory, and the psychology of thinking. There is as yet no unified psychological theory of creativity available to the research worker or the educational practitioner.
>
> (pp.1-2)

Guilford (1967) views creativity as inherent in all persons, qualitatively similar at all levels. His concern, therefore, is with quantitative differences relative to general population norms. Guilford (1950) maintains the subject of creativity has been neglected because previous research focused on studying people held to be geniuses and intelligence was the major factor considered in such research. Creativity, as we have already mentioned, is believed to be a different ability from intelligence. Guilford (1950) speaks of another reason which had led to this neglect. A practical criterion of creativity is difficult to establish because creative acts of unquestioned excellence are extremely rare.

Guilford (1950) approaches the subject of creativity from a psychometric point of view which implies that the creative ability follows the principle of the normal distribution of intellectual abilities in the general population. Thus, high and low creative people can be distinguished on the basis of quantitative differences in their ability:

> The general psychological conviction seems to be that all individuals possess to some degree all abilities, except for the occurence of pathologies. Creative acts can therefore be expected, no matter how feeble or how infrequent, of almost all individuals. The important consideration here is the concept of continuity. Whatever the nature of creative talent may be, these persons who are recognised as creative merely have more of what all of us have. It is this principle of creativity in people who are not necessarily distinguished.
>
> (p. 450)

In fact, Guilford's approach has contributed towards bringing the subject of creativity into the domain of psychology. Prior to that, literature on the subject had consisted mainly of theoretical and philosophical speculation.

Guilford (1963) makes a distinction between creative potential and creative production. Creative production involves creative achievements of different forms in the arts, literature and science. Creative potential, on the other hand, is defined by Guilford as being, at its simplest, an individual's potential for producing novel ideas or psychological products. We should include in this definition the production of all ideas involving new associations.

In his structure-of-intellect (SI) model, Guilford (1960) refers to the creative abilities which are essential for creative thinking. These abilities (fluency, flexibility, originality, and elaboration) lie in the divergent production category. Divergent production is conceptualized by Guilford as the generation of information from given information where the emphasis is upon variety and quantity of output from the same source. According to Guilford, divergent production is likely to involve transfer recall. The output has not been connected with given information before in the previous operations of the individual. Thus, remote associations occur and new associations are formed without their being aroused by direct stimulation from the

environment. Consequently, such activity is characteristic of much behaviour that is recognized as being creative, and divergent production abilities in general play important roles in creative production. In addition, Guilford believes that redefinition abilities and sensitivity to problems are also important in creative thinking.

Guilford's research confirmed the usefulness of the SI model and many of his predictions have been confirmed by subsequent work in this area. Although Guilford is primarily interested in identifying the intellectual abilities of creative persons, he believes that productivity depends on such variables as interests, attitudes and temperament. Guilford (1975) writes:

> What is true of the multivariate nature of intellectual talents is probably also true of nonintellectual qualities. No one person possesses all the favourable qualities. His stronger motivational traits direct his interests and determine to some extent his source of satisfaction. His temperamental characteristics may help to determine his strategies, and, in general, the way in which his talents are employed. The joint effects of intellectual and nonintellectual qualities may well be observable in what have been called 'cognitive styles' or 'cognitive attitudes'.
>
> (p.44)

Amongst other attempts at defining creativity, there is that of Barron (1969), who considered it simply as the ability to bring something new into existence. Barron defines creativity as:

> Power of an outstanding order which is marked by the voluminous production of acts which can claim a notable degree of originality, and the occasional productions of acts of radical originality.
>
> (p. 38)

Ghiselin (1958) has postulated two kinds of creativity: the creativity manifested in those who devote their lives to creative ends, and the creativity manifested by the general population. This implies that there is a qualitative difference between the products of the general population and those of creative people devoting their

entire lives to creative ends. For Ghiselin, the higher type of creative work changes the universe of meaning by introducing into it some new order of significance.

Koestler (1964) has also offered a set of criteria that may be helpful for grasping more deeply the concept of originality. Creative work requires: (a) previous independence of the skills or elements that are transformed and integrated into new synthesis; (b) involvement of several levels of consciousness, guidance by the sub-consciousness process normally under restraint; (c) activation of regenerative potentials rather than dynamic equilibrium; (d) superflexibility; and (e) novelty.

The USA office has developed the concept of 'inventive level' in order to judge whether a product or process is patentable. This organization has developed the concept of 'inventive level' originality. The major criteria for inventive level are (McPherson, 1963): (a) newness associated with overcoming a special difficulty - the inventor 'offers something unusual, remarkable, surprising'; (b) usefulness associated with making a stride forward, going beyond previous solutions; (c) considerable experimentation before achieving a novel solution; (d) prior failure to achieve successful solution; (e) prior scepticism that a successful solution was possible; (f) existence of an unsatisfied desire which the solution or product satisfies.

Stein (1956) had suggested that creativity is

> that process which results in a novel work that is accepted as tenable or useful or satisfying by a group at some point in time.
>
> (p.172)

This notion, that acceptance occurs at a particular point in time, represents an historical point of view, one which calls attention to the fact that societies and their values undergo change. It implies that there is no absolute way to define creativity and that that which is regarded as creative in one culture at some point in time may not be in another.

Parnes (1967) believes that what is new to the creative person may be termed a creative product:

> Creative behaviour is defined in essence as the production and uses of ideas that are both new and valuable to the creator.

According to this definition, the frame of reference is the creative person himself. As long as the idea is new and valuable to the creative individual it may be called creative.

As shown above, then, originality of products has been regarded from four different perspectives. Ghiselin (1958) believes that an outstanding creative product should be original in the absolute sense of possessing novelty. Stein (1956) believes that the novelty of a product can be determined according to whether it has appeared useful to a particular group of people at some point in time. Parnes (1967) considers that what is new and valuable to the creative person may be called creative. The fourth view, expressed by Koestler's and the USA patent office's definitions of originality, seems to be more objective and practical in dealing with the assessment of creative products. These four views show that the concept of novelty varies according to what is meant by creativity.

It seems, however, that our available methods and purposes determine the more practical criteria upon which we can assess creativity. The present researcher believes that in educational

settings students' creativity can be measured according to two essential factors: the statistical rarity of a response, and a response's usefulness. A response may be termed creative if it satisfies these two conditions.

Rogers (1959b) sees creativity as

> the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand and the materials, events, people, or circumstances of his life on the other.
>
> (p.71)

In this definition, the interaction between the creative person and the environment is stressed. In his theory of creativity, Rogers (1959b) determines three conditions within the individual which are most closely associated with creative productivity. Firstly, there must be 'openness to experience', which means lack of rigidity and defensiveness and the permeability of boundaries concerning concepts, beliefs, perceptions and hypotheses. Such openness includes a tolerance for ambiguity and the ability to receive conflicting information without forcing closure upon the situation. Secondly, there must be 'an internal locus of evaluation'. Here the basis of evaluation lies within a person's own self in his 'own organismic reaction to and appraisal of his own product' (p.64). Though it in no way implies the creative person being oblivious to the judgements of others, this valuation is independent of an outside source or locus. It is his own feeling and satisfaction which really matter to the creative person. Finally, creativity involves

> the ability to toy with elements and concepts; this personality trait allows the creative person to play spontaneously with ideas, colours, shapes, relationships.
>
> (p.76)

It is from this spontaneous toying and exploration, which is closely related to openness and lack of rigidity, that 'there arises the hunch, the creative seeing of life in a new and significant way' (p.76). Rogers also refers to two essential environmental conditions for creativity: 'psychological safety', and 'psychological freedom'. Both are important for creative expression. This view emphasizes that developing one's creative potential is virtually identical to one's becoming more self-actualized. Rogers describes the creative person as a 'fully functioning person'. This person is

> likely to be a creative person due to his sensitive openness to the world, his trust in his own abilities to form new relationships with the environment, and as a result of this tendency to move toward becoming himself.
> (p.62)

Rogers (1959b) stressed the importance of creativity for mental health. The tendency towards self-actualization is considered to be the primary motivation for creativity: 'The organism is being creative, forms new relationships to the environment in its endeavour most fully to be itself.' In another context, Rogers (1961) argues that the person becomes more creative when he becomes more open to his experience. He writes:

> To the extent that this person is open to all his experience, he has access to all of the available data in the situation on which to base his behaviour.He has knowledge of his own feelings and impulses, which are often complex and contradictory ... of social demands and memories of similar situations. He has a relatively accurate perception of this external situation in all of its complexity.
> (p.118)

Maslow (1954, 1968) has suggested two levels or distinct types of creativity. There is first the 'little-understood-talent'-type creativity, exemplified by such unique individuals as Mozart. Such geniuses display innate capabilities characterized by a complex and

unique drive. The second is the self-actualized creativity, akin to the naive creativeness of unspoiled children, a potential given to all human beings at birth. Of particular importance to Maslow (1968) is the self-actualizing creativity, which

> stresses first the personality rather than its achievements, considering these achievements to be epiphenomena emitted by the personality and therefore secondary to it. It stresses characterological qualities like boldness, courage, freedom, spontaneity, perspicuity, integration, self-acceptance, all of which make possible the kind of generalized SA Self-Actualizing creativeness which expresses itself in the creative life, or the creative attitude, on the creative person.
>
> (p.145)

Although the concept of creativity is interestingly spoken of by Maslow, there is a problem: how do we measure SA creativeness according to such a general formulation? Maslow (1968) himself recognizes this problem:

> I am quite aware that I have been trying to break up widely accepted concepts of creativity without being able to offer in exchange a nice, clearly defined, clean-cut substitute concept. SA creativeness is hard to define because it seems to be synonymous with health itself.
>
> (p.145)

Newell, Shaw and Simon (1962) have suggested the following criteria, one or more of which must be satisfied for a product to be considered creative. Such a product must either (1) have novelty and value, either for the thinker or the culture; (2) be unconventional in the sense of requiring modification or rejection of previously accepted ideas; (3) result from high motivation and persistence, either over a considerable span of time or at a high intensity; or (4) result from the formulation of a problem which was initially vague and ill-defined.

The above-mentioned definitions of Guilford (1950, 1967), Barron (1969), Ghiselin (1958), Koestler (1964), the USA Patent Office

(McPherson, 1963), Stein (1956), Parnes (1967), Rogers (1959b, 1961), Maslow (1954, 1968) and Newell, Shaw, and Simon (1963) have all maintained that there must be something new in order for a product to be termed creative. These definitions represent the product approach to defining creativity. This approach also involves the examination of outstanding creative works by specialists. It focuses too on an analysis of the components of exemplary creative output, and involves the development of criteria for evaluating creative products.

It should be mentioned that the product approach is of value only in those cases where the people under consideration all have the same opportunities for producing creative works. Adults, in particular, are likely to come from widely differing backgrounds and to have had widely differing opportunities, whereas with children the case is different. Thus it is evident that potentially creative children will be excluded if we depend for identifying them on the criterion of real creative acts. Potentially creative children, therefore, should be studied employing different criteria, such as creativity tests, observation techniques, creativity inventories, and performance on creative activities. Such procedures can help in identifying children with creative potential, and by these means we can create appropriate conditions for the encouragement of their creative behaviour.

The second approach employed in defining creativity is the process approach. Researchers have attempted to examine the processing or cognitive manipulation which occurred during the production of a creative achievement. This approach sometimes takes the form of introspective analysis by the highly creative person of his own creative production process.

It has been suggested by psychologists (Maslow, 1967; Kubie, 1958; Ghiselin, 1952, 1958) that the creative process is closely related to unconscious and pre-conscious functioning. Artists and scientists in their autobiographies have declared that creative ideas were at the beginning not very clear in their minds. The ideas were elaborated consciously later. Ghiselin (1952) writes: 'Creative production by a process of purely conscious calculation never seems to occur.' For Wallas (1926), the creative process involves four stages: (1) preparation; (2) incubation; (3) illumination; and (4) verification. Thus, the period of unconscious mental processes is called the incubation stage. Prior to that had come the preparation, wherein powerful conscious efforts had been made by the creative person to acquire relevant concepts and skills. Both the preparation and incubation stages pave the way for the creative idea to come, the illumination. Then comes a period of testing of the creative idea or solution, the verification stage.

As has already been mentioned, the process approach can also take the form of testing by researchers of the mental abilities which are significant in creative thinking. Torrance (1974), for example, has defined creative thinking as

> a process of becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on; identifying the difficulty; searching for solutions, making guesses, or formulating hypotheses and possibly modifying and retesting them; and finally communicating the results.
>
> (p.8)

Torrance (1962) writes that this definition describes the creative process as it has been explained by creative people:

> Apparently the process flows something like the following. First, there is the sensing of a need or deficiency, random exploration, and a clarification or 'pinning down' of the problem. Then ensues a period of preparation accompanied by reading, discussing, exploring and formulating many possible solutions, and then critically analyzing these solutions for advantages and disadvantages. Out of all this comes the birth of a new idea - a flash of insight, illumination. Finally, there is experimentation to evaluate the most promising solution for eventual selection and perfection of the idea. Such an idea may find embodiment in inventions, scientific theories, improved products or methods, novels, musical composition, paintings, or new designs.
>
> (p.17)

Torrance developed his own tests of creative thinking abilities and carried out a large number of studies in the USA and other countries. He is convinced that creative ability must be recognized as different from general intelligence and that education can do a lot for developing this ability.

Mednick (1962), following the associationistic tradition, defined creativity as

> as the forming of associative elements into new combinations which either meet specific requirements or are in some way useful.
>
> (p.220)

Mednick claimed that his definition is applicable to all creative thoughts. He made a distinction between originality and creative thinking. An original idea must be useful to be termed creative. Mednick writes, however, that it is difficult to apply this condition in many areas of endeavour, 'in which the usefulness of the products would be difficult to measure reliably'.

Mednick's Remote Associates Test (Mednick, 1962; Houston and Mednick, 1963) was designed to measure creativity on an associative basis. This test comprises 30 items, each containing 3 words which represent a mutually remote associative cluster. The time allowed for answering the test is 40 minutes. The subject is asked to give a word

which combines the three words in a specified manner. An example was given as follows: 'Surprise-Line-Democratic'.The word which associates with these three is 'party'. The score is the sum of the right answers given by the subject. Mednick claims that the validity of the test is supported by empirical evidence. It has been argued, however, that this test measures convergent abilities, since the respondent is supposed to find the right answer, which is determined by the test design. Also, the test is culturally biased since it is very difficult for any person who is not conversant with American culture to answer it.

Mackinnon (1962) describes the creative process as follows:

> It involves a response or an idea that is novel or at the very least statistically infrequent. But novelty or originality, while a necessary aspect of creativity, is not sufficient if a response is to lay claim to being a point of the creative process; it must also to some extent be adaptive to reality. It must serve to solve a problem, fit a situation, or accomplish some recognizable goal. And thirdly, true creativeness involves a sustaining of the original insight, an evaluation and elaboration of it, a developing of it to the full.

Mackinnon goes on to indicate that creativity involves 'a process that is extended in time and characterized by originality, adaptiveness, and realization'.

Arieti (1976) described creativity as the 'magic synthesis'. This magic synthesis is described as a binding together of the primitive, irrational forces of the unconscious with the logical, rational, and cognitive mechanisms of the conscious mind. He used the term 'tertiary process' to differentiate this process from primary (unconscious) and secondary (logical, rational) processes.

The above-mentioned definitions of Torrance (1974), Mednick (1962), Mackinnon (1962) and Arieti (1976) conceived of creativity in terms of the mental processes involved in creative thinking. Research

employing this approach has produced interesting results. In most of these studies, however, creativity was measured in terms of test scores. Many scholars have criticized the use of creativity tests as the criterion of creativity. Vernon (1964), for instance, suggested that these tests were not measuring an ability significantly different from intelligence.

The third approach used in the area of creativity is the personality traits approach. It has been mentioned earlier that certain personality traits seem to be dominant in people distinguished as creative. It is supposed that these traits generate subsequent creative behaviour and production. According to this view, creativity is seen rather as a personality dimension than as a composite of cognitive abilities.

Creative persons in Mackinnon's (1962, 1965) studies, for example, were able to perceive problems correctly, were cognitively flexible, and were capable of reformulating the problem so as to perceive a hitherto hidden solution. They were also perceptually intuitive, independent in thought, capable of tolerating conceptual ambiguity and less interested in facts - and more concerned with their meaning and implications - than were non-creative persons. Mackinnon (1965) believes that creative people are especially open to experience, both of their inner self and of the outer world. He also sees the self-concept as playing an important role in the context of creative abilities: The creative person has solved the problems of his own identity.' Mackinnon (1962) gives evidence that the more creative an individual is the more he reveals an openness to his own feelings and emotions, a sensitive intellect and understanding, self-awareness and wide-ranging interests. Creative people were also found to be

relatively free from conventional restraints and inhibitions, not preoccupied with the impressions which they may make on others. They also appear to be capable of greater independence and autonomy, and relatively ready to recognize and admit to holding views which are unusual and unconventional.

Barron (1963b) carried out an investigation wherein originality tests were administered to a group of Air Force captains. Barron considered originality as a significant factor in creativity. The results of his study showed that original persons

> prefer complexity and some degree of apparent imbalance in phenomena; ... are more complex psychodynamically; ... are more independent in their judgements; ... are more self-assertive and dominant; ... rejected suppression as a mechanism for the control of impulse.
>
> (pp.146-8)

In their research into the personality characteristics of 155 eminent living artists and writers, Drevdahl and Cattell (1958) found that these people in comparison with others were more intelligent, more fluent, more flexible, more original and more emotionally stable. They were dominant, adventurous, unconventional, radical and self-sufficient and had great singleness of purpose. They were also logical and objective in their thinking.

The studies of Mackinnon (1962, 1965), Barron (1963b) and Drevdahl and Cattell (1958) are examples of those studies which used the personality approach to the investigation of creativity. Other studies in this area are discussed in Chapters Three and Four.

It should be stated that no matter what particular explanation or approach one adopts the creative act cannot be seen in isolation. It is the result of a complex set of factors, cognitive, affective and environmental, interacting with a whole organism. This interaction, while producing a tendency for a person to act creatively in one way

or another, also affects that person's lifestyle. Creativity is linked with cognitive performance as well as personality factors.

Measuring of creativity is a very difficult problem. First of all we must distinguish between two concepts, the criterion and the predictor. The criterion in creativity is the actual creative product. Examples of criteria of creativity are experts' judgements concerning creative works, productivity, and patents. The predictor is any other method used for evaluating creativity, such as ability tests, personality inventories, and ratings of teachers or peers. It can, however, be argued that valid predictors can be useful in studying potentially creative students who have not yet achieved actual creative products.

Since Guilford's (1950) address to the American Psychological Association, efforts have been carried out to design tests (or predictors) which can measure creative abilities. Guilford emphasized that previous testing methods were mainly tapping evaluative and convergent abilities. Because of this, creative abilities were neglected. Guilford (1950) writes:

> If the correlations between intelligence test scores and many types of creative performance are only moderate or low, and I predicted that much correlation will be found, it is because the primary abilities represented in these tests are not all important for creative behaviour. It is also because some of the primary abilities important for creative behaviour are not represented in the test at all ... we must look well beyond the boundaries of the IQ if we are to fathom the domain of creativity.

Since the fifties efforts have been made to design new tests which can help in creativity research. Guilford developed his own battery of divergent thinking tests which are claimed to be suitable for secondary school and university levels.

Much of the experimental work on creative thinking has been

inspired by the pioneering efforts of Guilford's conceptulization. In fact, much research is still needed in order to ensure the validity of such tests. However, Guilford's theory has been criticized in terms of the methodology employed for the discovery of mental abilities in his model. Barron and Harrington (1981) write:

> Though Guilford's Structure-of-Intellect (SI) model has continued to dominate discussions of the relationship between intelligence and creativity, the SI model has been increasingly criticized on technical and conceptual grounds ... Critics object to the alleged subjectivity of the underlying rotational procedures, to Guilford's insistence upon orthogonal rather than oblique factors, to some possible narrowness in the 120 (!) SI abilities, to the alleged psychological superficiality of the SI's 'product' category, and to the tendency of the model to suggest that the operations (cognition, memory, evaluation, convergent production and divergent production) are mutually exclusive and isolatable.
>
> (p.444)

Torrance (1965, 1974) designed a battery of creative thinking tests which included verbal and figural tests. These tests can be used from kindergarten to university years. Torrance, unlike Guilford, developed complex tests which are scored for various types of creativity factors. Thus each test is scored for fluency, flexibility, originality and elaboration. Torrance assumed that when these abilities are measured by more than one test, the multiple scores may be combined to represent that dimension. Torrance's tests have become the most standard battery and the most commonly used in creativity research. Nevertheless, the validity of these creativity tests is questioned by many workers in this field. For instance, Vernon (1980) maintains that evidence of relation between the Torrance tests and everyday life criteria of creative achievement is weak. There is a need for comprehensive, systematic validation studies, showing the relation of these tests to measures of other intellectual traits as well as to practical criteria. Hitchfield (1973) also found no

evidence to support the existence of an independent ability of creativity. The sample used in her research was a nationally representative group of gifted British children who were selected on the basis of multiple criteria. Among these were divergent thinking tests. Hitchfield's findings show that both convergent and divergent thinking tests should be used for measuring intelligence. Hitchfield writes:

> The conclusion drawn from the results suggested that the intelligence tests measured many abilities, including those labelled 'divergent'. The higher the children's IQs the higher were their divergent thinking scores. The variation in scores on convergent and divergent tests in this group of children may yield interesting information on individuals, but it gives no support to the idea that intelligence and creativity are separate factors in the intellectual ability.
>
> (p.28-9)

It has been shown that the significant aspects of creativity tests, validity and reliability, are very difficult to control. One may agree that the characteristics creativity tests have been found to measure are to some extent different from those measured by tests of intelligence. One cannot accept, however, that these qualities equate with creativity. There is no real evidence that 'creativity' tests are valid tests of creativity in general. Vernon (1980) states:

> Research has still not given a clear answer to such questions as whether creativity is an ability distinct from intelligence, or whether, as Thurstone and Guilford supposed , it involves a number of different primary mental abilities or factors. Nor do we know what kind of tests, given in what manner, best predict future creative capacities of students and adult workers. A good deal of confusion in this area arises from loose usage of terms like creative, original, non-conformist, gifted, talented, genius, etc... There are many kinds, as well as degrees, of creativeness. Should we expect to be able to subsume a child's drawings or his father's gardening under the same principles as Einstein's theory of relativity.
>
> (p.12)

Because of such criticism regarding creativity tests, some researchers, e.g. Hudson (1966), prefer not to use the word 'creativity' because the nature of the questions in such tests demands that each person's responses and score be individually interpreted and formulated. Because of its overall connotation and its implied relationship with creative persons, the word 'creativity' is confusing, especially as there is no guarantee that a person of recognized creativity would score high on a creativity test. Hudson, therefore, prefers to call his tests 'open-ended tests'. People who obtain high scores on his tests are 'divergers', and those who obtain low scores on his tests are 'convergers'.

The above discussion shows that there are problems in defining and measuring creative thinking. These range from the absence of a widely accepted theory of creativity to a possible overabundance of available creativity measures. If what is meant by creativity varies, it would seem to follow that what is actually being measured by these measures must vary from one to another. Because of the problems associated with creativity tests the present researcher decided to employ the personality approach in his own study.

In a number of studies using the 16PF, it has been shown that creative people in both the sciences and the arts are more independent, more intellectually self-sufficient, less stable and more radical than average (Cattell and Butcher, 1968). Scientists tend to score highly on withdrawal behaviour items, whilst artists (painters in particular) score on unconventionality and eccentricity. Taylor and Holland (1964) suggest that the available evidence shows creative people to be more autonomous, self-sufficient, self- assertive and resourceful. They are also more introverted, more inclined towards

feminine interests, more aware of their impulses, and more open to the irrational in themselves. Other investigators have found creative people to have a high tolerance of ambiguity, and to be capable of a high level of abstract thought. As with intelligence, most studies indicate that people who make effective use of their high level of creativity are generally stronger on achievement motivation. They have a single-mindedness which enables them to work hard in their chosen field and to show a high level of interest and involvement in the things they do.

The personality approach has been used recently in a number of investigations which have applied new personality inventories that have been found to be effective in identifying potentially creative persons. Davis (1975) records two assumptions regarding personality and biographical information as predictors for creative behaviour. The first: 'There are attitudes, motivations, interests, values and other personality traits that predispose a person to think and behave more creatively' (p.77); the second: 'Biographical reports of past creative interests, habits and activities are excellent predictors of future creative interests, habits and activities' (ibid.). Bull and Davis (1980), using this approach, devised the Statement of Past Creative Activities (SPCA) instrument, which was found to be a good predictor of other indices of creativity. These indices included ratings of art and writing projects, measurers of affective characteristics of creative people, and scores on the Sounds and Images test (a creativity measure).

Rimm, S. et al. (1982) have carried out a number of experiments in order to validate their new personality inventories designed for assessing creative characteristics. The researchers were attempting to

produce easy-to-administer, reliable and valid tests. Four instruments were devised. The first is the Group Inventory for Finding Creative Talent (GIFT), developed by Rimm (1976) for primary children. For junior and senior high school students, GIFFI I and GIFFI II (Group Inventory for Finding Interests) were developed by Davis and Rimm (1982). Finally there is the Preschool Interest Descriptor (PRIDE), a pre-school and kindergarten parent report inventory designed by Rimm (1981). Evidence was presented which showed these instruments to be useful, especially if some other criteria is used with them. The reliability and validity of the group inventories were tested as follows: (1) the Spearman-Brown formula for the split-half method was employed for calculating reliability; (2) construct validity was ensured by the drawing from other creativity measures, evolved in previous research, of items which describe creative persons' personality characteristics; and (3) criterion-related validity was established by calculating the correlation coefficients between the inventory scores and other measures of creativity, a composite score consisting of teacher ratings of creativity and experimenter ratings of short stories.

Davis and Rimm (1982) write:

> The reliability and validity of the inventory approach, coupled with the ease and efficiency of group administration, makes instruments such GIFFI I and GIFFI II especially useful for large screening of gifted education programmes. Of course in selecting for creative talent inventory scores should be used in conjunction with other information, such as teacher ratings, work samples, anecdotal reports on parents' nominations. A dual criterion for selecting creatively gifted children, such as scores in the top quarter of GIFFI I or GIFFI II and teacher nomination as 'creative', virtually guarantees accurate selection of creatively gifted children.
>
> (p.56)

Regarding the two inventories of measuring creativity in secondary school students, Rimm et al. (1982) write:

> GIFFI I and GIFFI II measure personality and biographical characteristics associated with creativeness; for example, self-confidence, high energy levels, adventurousness, risk-taking, curiosity, humour, interest in art, interest in ideas, attraction to complexity and mystery, and one's background of creative hobbies and activities.
>
> (pp.168-9)

In this section, definitions of creativity grouped into three categories, product, process, and personality traits, have been discussed. In addition, different criteria of creativity have been presented and criticized in the light of their validity and applicability in educational research. Previous work in this area has helped the present researcher to evolve his own approach to studying creativity. Along with the GIFFI I inventory, teachers' ratings of students creativity in Arabic and drawing were used in order to assess students' creative performance. Elaboration of the measurement of creativity in this sample is presented in Chapter Seven.

This particular criterion of creativity is employed because, firstly, the sample includes preparatory school children, whose average age is 14 years, and who of course have not achieved notable creative works. The present researcher believes that the GIFFI I creativity inventory and teachers' ratings of students' creativity represent appropriate methods for assessing this factor in Egyptian school children.

Creativity and Intelligence

Guilford (1950) predicted that the relationship between intelligence and creativity would be low. Since that time his hypothesis has generated some controversial findings concerning the

relationship between these constructs. The first study which aimed at testing Guilford's hypothesis was that carried out by Getzels and Jackson (1962). This study found positive but low correlations between the constructs. Mille and Merrifield (1962) criticized Getzels and Jackson's research as being ill-designed and inadequately reported. The researchers were especially critical of the failure to provide any information about children who had high scores on both divergent and intelligence measures. In addition, Burt (1962) has raised the point that while the relationship between divergent thinking measures and intelligence scores is low, the correlations between the various divergent thinking tests themselves are often of the same magnitude.

Wallach and Kogan (1965) conducted a review of those studies which had dealt with the relation between creativity and intelligence. They concluded that the divergent thinking measures were not assessing an attribute distinct from general intelligence. They therefore designed their own tests of divergent thinking, which were based on an associative conceptualization of creativity. They argued that, unlike the interrelationships found between their subtests, the separate subtests of the widely used Minnesota tests of Creative Thinking probably share no more variance with each other than they share with general intelligence tests. In their research the mean correlations within creativity and within intelligence measures were 0.41 and 0.51; the mean creativity intelligence correlation was 0.09. Wallach and Kogan reported that their construct of creativity possessed an internal consistency and comprehensiveness similar to that possessed by the general intelligence domain, and that it was fundamentally independent of intelligence.

Wallach and Kogan's (1965) research, however, was criticized by

Cronbach (1969) on two grounds. First, Cronbach was not in favour of separating the boys and girls in the analysis because this separation decreased the degrees of freedom and lowered the power of the tests. There should be statistical evidence of interaction based on sex before making such a division. Secondly, Cronbach pointed out that creativity and intelligence were not the actual constructs being measured in the research.

A study by Madaus (1967) also aimed at examining Wallach and Kogan's hypothesis, using a sample of high school students. Madaus found a correlation matrix for the Minnesota tests of creativity closely related to that of Wallach and Kogan. This finding contradicted their hypothesis. Divergent thinking measures were independent from convergent thinking tests. Unlike Wallach and Kogan, Madaus found task-specific measures of selected tests of the Minnesota battery highly interrelated within both the verbal and figural tests. Madaus also found that measures with the same construct name (e.g. originality, fluency) had low correlation across the verbal and figural tests. This finding lent partial support to Wallach and Kogan's hypothesis.

Clarke (1968) studied the creative thinking of British boys and girls whose ages ranged from 9 to 15. The children came from two schools outside London. A negligible relationship between the Minnesota tests of creative thinking and the NFER verbal reasoning scores was found.

Hasan and Butcher (1966) gave similar tests to those used by Getzels and Jackson to a sample of 175 Scottish children (mean IQ 102). They found a stronger correlation between creativity and intelligence than Getzels and Jackson had found. The highly creative

Scottish children were lower in attainment than the highly intelligent children. The teachers preferred the highly intelligent children to the highly creative ones.

In a survey of studies which dealt with creativity and intelligence, Torrance (1967b) summarized the results as follows. The median of a total 178 coefficients of correlation between measures of intelligence and a total composite measure of creativity was 0.20. When Torrance divided the composite score into verbal and figural creativity he found a median correlation of 0.21 for 88 studies of the former and a median correlation of 0.06 for 114 studies of the latter. He concludes:

> These data impress one with the futility of doing simple correlation studies of the relationship between measures of intelligence and creative thinking abilities. The nature of both kinds of measures, the sex and age of the subjects, the range of the intelligence test scores, and motivational factors must be considered.

Moreover, the Torrance group has presented no data that would permit one to evaluate whether or to what extent the previous creativity procedures they used inter-correlate more strongly with one another than the degree of their separate correlations with general intelligence.

Another view regarding the relationship between creativity and intelligence is put forward by Mackinnon and Barron. Mackinnon (1962) believes that creativity is dependent upon intelligence up to a certain level of intelligence but that above that level two factors become independent. He writes:

> It is clear that above a certain required minimum level of intelligence which varies from field to field and in some instances may be surprisingly low, being more intelligent does not guarantee a corresponding increase in

> creativeness. It is just not true that the more intelligent person is necessarily the more creative.

Barron (1969) also writes that intelligence is not unrelated to creativity. Intrinsically creative persons, according to Barron, are of quite high measured intelligence, but their degree of creativity does not covariate significantly with their intelligence scores.

Recent findings regarding the relationship between creative achievements and intelligence reflect earlier results (Bachtold and Werner, 1973; Gough, 1976; Helson, 1971). For example, Gough (1976) obtained a correlation of -0.05 between the two variables, whilst in Helson's (1971) study the value of the correlation was +0.31. On the other hand, studies dealing with the relation between divergent thinking and intelligence which Horn (1976) and Vernon et al. (1977) have reviewed generally indicate that the relationship between these two constructs vary to a large extent. The factors which seem to affect this relationship are: the kind of divergent thinking tests administered, sampling procedures, range of intelligence scores, and testing conditions.

To sum up, the studies mentioned above, which deal with the relationship between creativity and intelligence, suggest that this relation depends upon many factors, such as criteria of creativity, intelligence, and samples. It does seem that a certain level of intelligence is needed if an individual is to be able to organize and to use his creative talent effectively. It can be concluded that creative (or divergent) thinking and intelligence (convergent ability) are two integrated aspects of a broad intellectual functioning. Both divergent and convergent thinking should be taken into account when new measurement tests are being developed.

Creativity and Culture

Although the creative process is produced by the creative person who possesses specific characteristics, it is also influenced by his interactions and relationships with other people. In other words, the creative process is affected by the socio-cultural context, which includes main and sub-groups to which the individual belongs and in which he has a specific status and plays a specific role. Each of these groups has its values and beliefs which answer to the individual's different needs. Socio-cultural factors can either encourage or hinder creative growth. Understanding these factors is crucial if we are to further our knowledge both of the creative process and of the creative individual.

Thus a comprehensive understanding of creativity necessitates an investigation of the socio-cultural conditions affecting creative growth. That our knowledge in this area is still inadequate is stressed by, in particular, Gardner (1983). Although this area of research is a very important one, few empirical studies have been carried out in it. Mar'i (1976) maintains:

> Only after we have determined the environmental, cultural and social conditions that block the creative potential of individuals, and other conditions that are conducive to the development of these talents, can we achieve the universal goal of modern education: the development of the learners' creative talent.
>
> (p.108)

Societies differ in their attitudes towards innovation, and as Torrance (1967b,1969) has already demonstrated, creativity does suffer in cultures that do not appreciate creative people. (1) Torrance found

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(1) Cp. Tannenbaum (1983), which argues that society's attitude to the work of gifted individuals has often been fundamentally ambivalent.

significant correlations between the value placed on creativity and the creative performance of school children. He concludes: 'What is honoured in a culture is cultivated there.' Although evidence of discontinuities in creative thinking was found in all cultures tested, Torrance (1968) believes that stimulation through appropriate conditions can help to prevent this decline. It seems, then, that the way creative abilities develop and function is strongly influenced by the way the environment supports a person's creative needs.

Theorists tend to agree that at some time in childhood creativity or the creative potential decreases or disappears so that adults are relatively lacking in creativity. Many theorists are quite forceful in their description of what happened to creativity. For Maslow is it 'lost or buried or inhibited as the person gets enculturated' (1959, p.86). For Stoddard it is 'stifled in millions of school children' by rote learning and conformity (1959, p.181). For Fromm the process of education leads to a loss of the 'capacity of wondering, of being surprised' (1959, p.48). For Anderson, 'domination' leads to a 'throttling of the child's spontaneity and a stifling of his creativity' (1959, p.138).

There is considerable agreement among theorists as to where the blame for this loss of creativity in individuals ought to be assigned: society's pressuring people to conform is almost always the villain. Anderson's conclusion is representative of the position of most theorists:

> That life is creative and that children are born with qualities and capacities for creativity were major premisses of most of our authors and were not denied by any.That adults are not creative, that they are passive, fearful conformists, was admitted and bemoaned. Perhaps the most consistent protest in the book is against conformity.
>
> (1959, p.256)

Despite the insistence that society demands an inhibition of creativity or even destroys creativity, none of the recognized theories describes how or when this process takes place. If, as Anderson and others suggest, it is inherent in the process of socialization that creativity be curbed, then the process of extinction must take place, or at least begin, during early infancy.

It is interesting that Freud, who is often attacked for his pessimism and for having held an unflattering a view of human nature, views the development of creativity as an emerging function. Rather than being predetermined or given at birth, the ability to use sublimation is developed as a result of many early experiences, but one which is directly related to increasing maturity rather than to infantilism (Freud, 1947).

Societies also vary in their degree of receptivity towards original ideas according to their level of cultural development. The following are two examples relating to this, one from a traditional and one from a modern society. Mead (1959), in her discussion of innovation in traditional cultures, found Samoan people are only allowed to change the details of their dance, not the basic form of it. In other words, the culture allows them to add details, not to invent, in their dance. Secondly, Wallace (1962) states that American culture encourages innovation in sciences, technology, arts and religion, but is less receptive to innovation in politics and socio-economics. In this connection, Stein (1953) writes that

> the extent to which a variety of creative products are developed depends on the extent to which cultural influences permit the development of both freedom between the individual and his environment and freedom within the individual; on the extent to which the culture encourages diversity and tolerates the seeming ambiguity that such diversity suggests.
>
> (p.322)

Stein's view stresses the interaction between the creative person and his milieu. Thus a creative product must gratify a desire or the need of a group of people at a certain period of time.

Unless the efforts and products of creative people are recognized and rewarded one cannot expect the creators to feel satisfied. Unfortunately, creative people are often ostracized, mocked and seen as a source of trouble and threat by the societies in which they live. Cohen (1976) quotes Butcher (1972) as holding that

> any society, to avoid stagnation, needs a constant supply of original ideas at all levels; but the profoundly original men who are the most fertile source of these ideas are often the very people who most disturb society, by threatening its established ways of thought and familiar structure.

Creative people need to be supported in order for their creative energy to be preserved. It is very important to give creative people feelings of recognition and satisfaction. These feelings reinforce their productivity and give them more of a sense of value and self-esteem. They find that they have gained by what they achieved. It should be mentioned that recognition here includes both moral and physical recognition. In educational settings, Torrance (1965) found that the creativity of the experimental (rewarded) group was considerably higher than the creativity of the control (unrewarded) group.

Freedom is another important environmental condition for creativity. Society should provide its members with opportunities that enable them to satisfy their basic needs. Unless such needs are satisfied, we cannot expect that people will have enough time for relaxation and thinking. The other aspect of freedom is that people should be able to express their views and ideas without restriction. In such an atmosphere where there is freedom in both senses, satisfaction of basic needs and freedom of expression of ideas, people

can indeed produce original thoughts which in turn will be useful for cultural development.

Rogers (1959) refers to two essential environmental conditions for creativity, which he calls 'psychological safety' and 'psychological freedom'. Psychological safety is established by 'accepting the individual as of unconditional worth' and 'providing a climate in which external evaluation is absent' (p.79). Psychological freedom is accomplished 'through the absence of restraints on symbolic expression' (p.79). Absence of freedom simply leads to inhibition of creativity in people. In educational settings Torrance (1967a) has specified situational factors related to creativity and isolated important variables which foster or inhibit creative expression. He suggested that an environment, if it is to be conducive to creativity, must respect unusual questions, respect unusual ideas, show that ideas have value, provide opportunities and credit for self-initiated learning, and allow performance to occur without constant threat of evaluation.

In a discussion of socio-cultural factors and their impact upon creative thinking, Arieti (1976) writes:

> A society based on fair and just laws, providing the best possible psychological and economic conditions for all citizens, seems to be a good milieu for creativity. It is a plausible assumption that a 'good', 'healthy', or 'sane' society promotes creativity ... One may fairly assume that if a society sponsors the 'four freedoms' - freedom from fear and want, freedom of speech and worship ... more people will strive toward creativity than in a society deprived of these freedoms. It is difficult to believe that if people are in dire danger, or hungry, or sick, or in a state of slavery, they are likely to write symphonies or poems.
>
> (p.313)

Arieti adds, however, that the above-mentioned qualities are desirable in any society, not just a creative society. According to Arieti, specific characteristics should exist in a society in order to provide a climate propitious to creativity. These are:

(1) availability of cultural means;

(2) openness to cultural stimuli;

(3) stress on becoming, not just on being;

(4) free access to cultural media for all citizens, without discrimination;

(5) freedom, or at least the retention of only very moderate discrimination, after severe oppression or absolute exclusion;

(6) exposure to different and even contrasting cultural stimuli;

(7) tolerance for diverging views;

(8) interaction of significant persons;

(9) promotion of incentives and awards.

Studies with creative people suggest that they contain reverse-sex ingredients: men appear more feminine and women more masculine on personality tests (Barron, 1956; Mackinnon, 1962, 1965; Hammer, 1964; Torrance, 1963, 1965b). In Torrance's studies, potentially creative children experienced problems because of sex role identification. Torrance explains this by referring to two personality traits which are related to creativity: sensitivity and independence. Sensitivity is considered as a female trait while independence is regarded as a masculine one. Thus, in order to be creative girls have to be more masculine (independent) and boys have to become feminine (sensitive). Such a situation does not accord with cultural norms, and so what happens is that most of these children sacrifice their creativity, because they do not like to appear divergent from their less creative peers. In other words, children abandon their creative ability in order to keep their identified sex roles.

Cross-cultural research on creativity can help us to obtain a culture-free concept of creative behaviour. Creative contributions should not be confined to a particular society but should be for the welfare of all mankind. Such a concept can also help educators to prepare appropriate conditions for developing students' creativity. In spite of the importance of this culture-free dimension, few studies have been conducted in this area.

Torrance (1963, 1968, 1969,1974) examined creative development in children in grades one to six. These children were from the USA, Germany, Australia, Norway, India and Singapore. The developmental curves of creative thinking varied from culture to culture. Sharp decrease was found in the USA culture. This decline is explained by Torrance in terms of cultural factors. In another study carried out by Torrance et al. (1970), the aim was to examine the creative functioning of monolingual and bilingual Chinese and Malayan children of grades three, four and five in Singapore. The results indicated that the monolingual children scored more highly than the bilinguals on the fluency and flexibility factors. A reverse trend was evident concerning the originality and elaboration factors of creative thinking. This finding might suggest that bilingualism results in better performance on these two factors.

The research of Ogletree (1971) focused on students from Germany and Scotland. The study aimed at examining both the validity of the TTCT and teachers' ability to nominate their creative students. Ogletree concluded that

> not only were teachers successful in selecting their most creative pupils, but the creativity measures exhibit a significant degree of concurrent validity in countries other than the United States.
>
> (p.130)

Lembright and Yamamoto (1965) studied the creative ability of schoolchildren from two American subcultures, the American 'middle class' and an originally German Amish group in Ohio. In the latter culture, continuity in tradition has been maintained for many generations. The results indicated significant differences favouring the middle-class group. Another interesting finding was that the variance in the Amish group was less than in the other. These findings were explained by the observation that the Amish culture is extremely restrictive and suppressive with regard to spontaneous expression. The child is expected to follow the culturally provided model: his father, the farmer. Lembright and Yamamoto considered that this restrictiveness was responsible for the relative homogeneity (small variance) of the Amish group. They observed that, in the American middle-class group, the culture was much more permissive and receptive, and the family was more child-centred.

The above-mentioned studies of Torrance (1963, 1968, 1969, 1974), Torrance et al. (1970), Ogletree (1971) and Lembright and Yamamoto (1965) attempted to compare groups of students from different cultures and subcultures. However, questions regarding criteria measurements of creativity, sex differences, developmental trends, training for creativity and socio-cultural factors in creativity still need to be answered.

Creativity and Education

Educationists, psychologists, sociologists, economists and political leaders have all expressed views concerning the need to develop creative talents in the younger generations as a basic solution to the different problems (social, political, economic, technological and educational) facing society. To accomplish this aim there needs to be fundamental change relating to all aspects of

education - teaching methods, teacher training, curricula planning, educational objectives, evaluation techniques and school atmosphere.

Torrance (1970) identified a number of principles for the creation of a receptive school atmosphere which can help to develop creative thinking. Teachers must:

(1) know the learner;

(2) respond to the needs of the creative learner;

(3) build creative skills;

(4) heighten anticipation;

(5) encounter the unexpected and deepen expectation;

(6) go beyond textbooks, classrooms and curricula.

In such a productive atmosphere, creative thinking can be developed. Torrance (1970) describes the process of learning creatively as

> a process of becoming sensitive to or aware of problems, deficiencies, gaps in knowledge, missing elements, disharmonies and so on; bringing together in new relationships available existing information; defining the difficulty of identifying the missing elements; searching for solutions, making guesses or formulating hypotheses about the problems or deficiencies; testing and retesting these hypotheses and modifying and retesting them; perfecting them and finally communicating the results. (p.1)

In addition, parents should be aware of their children's behaviour. They should leave the child to explore and support him as he develops his own ideas. The child's interests should be encouraged. The home's role in reinforcing creative thinking is very important - it can augment what the child learned at school. Parents should try to foster confidence, independence, perseverance and original thinking in their children.

Mackinnon, in his extensive (1962) investigation of creative architects, considered especially the home background factors. He discovered that respect and autonomy granted to the creative architect as a child stood as the most salient characteristics of the group:

> What appears most often to have characterized the parents of these future architects was an extraordinary respect for the child and confidence in his ability to do what was appropriate. Thus they did not hesitate to grant him rather unusual freedom in exploring his universe and in making his decisions for himself and this early as well as late. The expectation of the parent that the child would act independently but reasonably and responsibly appears to have contributed to the latter's sense of personal autonomy.

Torrance (1965a,b,c; 1967c) believes that schools' emphasis upon conformity can lead to a stifling of the development of creative thinking in students. A permissive atmosphere, in which children argue, explore and question, is the appropriate way for this ability to flourish. Lowenfeld and Brittain (1982), on the other hand, maintain that creativity is misunderstood if it is considered as being the opposite of conformity, and this may explain why teachers are not concerned with developing creative behaviour in students. Lowenfeld and Brittain distinguish between two forms of conformity, physical and mental, as follows:

> We have to conform a great deal in our society to rules and regulations that mean safety for ourselves and others. This kind of physical behaviour is basic to society so long as these rules are able to be changed by those affected. There is another whole area of conformity, that of mental conformity, that may be of danger to our society. This may be a difficult thing for young children to do, but as adults we must be sure that the pressures of conformity are limited to those areas that are necessary for the sake of society. One of the difficult tasks of a teacher of young children is to provide socially acceptable ways in which children can use and be encouraged to use their creative abilities while keeping to a minimum the areas in which they will have to conform. (p.69)

Repression of students' creative needs may affect personality development and cause many problems such as behaviour problems, learning difficulties, neurotic distortions and conflicts. Torrance (1963) has found such problems leading to decline in students'

creativity. This decline is explained by Torrance thus:

> The roots of the difficulty stem from the inevitable pressures that are exerted against the expression of creative needs and abilities. The stronger the needs and the higher the abilities, the more severe the pressures are likely to be. As a consequence, at each critical stage of development, many children sacrifice their creativity. For some, this may begin at age five. For others, it comes at age nine or twelve, or at some later time. As they learn to cope with the new demands of a stage, some children recover while others apparently abandon their creativity, distort it, or hold tight reins on it.
>
> (p.43)

Torrance maintains, however, that evidence collected from many sources suggests that it is possible to revive creativity at any age, provided proper conditions are set for this purpose.

The major responsibility for cultivating creative behaviour in children lies with schools. Teachers should recognize students' abilities and try to relate what they have been studying to conditions as they actually apply in schools. Along with observing creative children in classes, teachers should try to use appropriate measures which help in the identification of creative behaviour. Once they discover that some of their children possess a creative ability they should provide those children with advice, encouragement and support. School counsellors should be asked for help if there is any indication of a problem. Teachers' awareness of the personality development and traits of creative children can help a great deal in this respect.

Talents never flourish in an authoritarian atmosphere. Classrooms, therefore, should be places where ideas can be expressed in an unthreatening climate. When teachers respect students' individuality, everyone in the class has the chance to express their views in a democratic atmosphere. Learning and experiences in the classroom, if carefully planned, may become life-related and

purposeful. The curriculum should become what Frazier (1976) refers to as

> a product of active learning and interactive teaching rather than a curriculum of prestructured content, in which both learning and teaching are intended to be largely passive in character.

It has been suggested that creative thinking is extremely important. Schools should be concerned with its development in children. Teachers can help in this respect by understanding children's development, recognizing the characteristics of potentially creative children and creating a productive atmosphere in their classes.

Conclusion

Creative thinking has been seen as a product, as a process and as a personality dimension. The vast majority of studies have dealt with creative thinking in students using criteria of creative (or divergent) thinking tests which measure the creative abilities: fluency, flexibility, originality and elaboration. These studies have been mainly influenced by Guilford's model of intellect. Such criteria as peers' and teachers' nominations of creative persons, and observation of students' behaviour in classes, have also been employed.

Because of the problems relating to the validity and reliability of creativity tests, the present study employed the personality characteristics approach, which involved applying the personality inventory (GIFFI I), and the ratings of students' creativity given by their Arabic and drawing teachers, to a sample of Egyptian schoolchildren.

Socio-cultural factors which affect creative growth have also been discussed. The environment which aims to stimulate creativity should encourage, recognize, provide freedom and reinforce creative behaviour in people.

Education can help students to develop their creative ability. Carefully planned experiences in a congenial classroom atmosphere enhance this ability. Special programmes and activities and workshops are some methods by which teachers may encourage creativity in their children. Above all, the whole educational system should be organized so as to stimulate thinking, not the memorization of facts. Co-operation between the home and the school can reinforce what children have been taught.

Chapter Seven

Methods and Procedures

Introduction

This chapter includes a statement of the study's hypotheses, a description of the sample and of the tests employed for measuring the variables, a description of the procedures adopted for carrying out the research, and a description of the statistical techniques used in the analysis of data.

The first objective of this study was to investigate the relationship between creativity and the personality variable of the locus of control in a sample of Egyptian preparatory school children. The second objective was to examine the sex differences between students' performances on the inventory, which measures creative characteristics, and their performances on the locus of control test. The third objective was to study the relationship between creativity and intelligence. The fourth objective was to study the relationship between the locus of control and intelligence. Regarding the sample of Egyptian preparatory school teachers, this study aimed at examining their concept of the ideal pupil and comparing it with the similar concept held by experts on the creative personality in order to reveal the attitudes of both these groups towards creative behaviour.

The Hypotheses

The following hypotheses were under consideration in the present research:

(1) That there would be a significant relationship between creativity, as measured by the creativity inventory and the teachers' ratings, and the locus of control as measured by the Nowicki-Strickland test;

(2) That there would be significant sex differences on the creativity measures as measured by the creativity inventory and the teachers' ratings, and I-E scores as measured by the Nowicki-Strickland test.

(3) That there would be a significant relationship between intelligence, as measured by the Pictorial Intelligence test, and creativity, as measured by the creativity inventory and the teachers' ratings.

(4) That there would be a significant correlation between the internal locus of control, as measured by the Nowicki-Strickland test, and intelligence, as measured by the Pictorial Intelligence test.

(5) That the concept of the ideal pupil held by the present group of Egyptian teachers, as measured by the Ideal Pupil check-list, would not be consistent with that held by experts on the creative personality.

The Sample:

When he came to considering the age-group of the students among whom the empirical study was to be conducted, the researcher decided to select his sample from preparatory (middle school) children, specifically second year students. There were particular reasons for this decision. Firstly, this particular age-group is important from the point of view of the process of crystallization of people's attitudes, interests, and ways of thinking. Secondly, it is clear from the literature that very little attention has been given to studying creativity correlates at this educational stage, whereas much work has been done at the primary and university levels. Thirdly, in the

Egyptian educational system students stay for six years in primary school, three years in preparatory and three years in secondary school. Thus this preparatory stage is important from the point of view of identifying different talents and abilities, especially creative potential. Early identification of able students increases the chances for preparing adequate programmes, activities, enriched courses and so on which may help students' development. Students in their second year of preparatory school were selected in particular because they had already spent a year in the school and had thus become familiar with it. Also, these students are usually not as worried about the final exam as those students in the third year who need to obtain high marks in the examination for the preparatory certificate in order to go to secondary school. In addition, second-year preparatory students, who are aged around fourteen, are expected to be less occupied with physical and social development relating to adolescnece than students in the third year. It was expected therefore that there would be more co-operation and more interest from the second-year students than from the others in answering the tests of the study. Teachers of second-year students were expected to co-operate more than teachers of the third year, being not so busy, and less concerned with achievement and examinations. The final reason for selecting the preparatory stage arises from the researcher's personal interest in working in preparatory schools, an interest which has been developed through supervising trainee teachers during their practical training in these schools.

El-Fayoum City, the area where this research was conducted, was chosen with the research sample of both students and teachers in mind. The reasons behind the choice of this city, and behind the choice of

sample, are as follows:

(1) The researcher lives in the city and works as a member of staff in its faculty of education. He is quite familiar with its culture and schooling conditions. This he believes to be of great help from the point of view of performing the experimental work appropriately;

(2) The fieldwork was confined to the schools of the city itself, excluding its towns and villages, because research findings reveal that there are differences in creative thinking between persons who live in urban areas and those living in rural areas;

(3) The education system in Egypt is centrally directed by the Ministry of Education in Cairo. Centralization ensures that all aspects of education, such as curricula, teacher training, enrolment, methods of evaluation and examination, are similar throughout all the cities in Egypt.

There was much preparatory work to do for the fieldwork. The researcher obtained one of the tests, GIFFI I (Level 1, Grades 6 to 9), by personal communication with one of the designers, Dr S. Rimm, in the USA in March 1983. The other tests were also prepared, and all except the Pictorial Intelligence test, which was standardized in Egyptian schools by Dr A. Saleh, were translated into Arabic. It was important that a translation be made that would prove understandable to the researcher's subjects while still being true to the original. The following instruments were administered to the sample of students (n = 230, 110 boys and 120 girls): (1) the creativity inventory GIFFI I; (2) the Nowicki-Strickland locus of control scale; and (3) the Pictorial Intelligence test. The sample of teachers were given the

following two tests: (1) the ideal pupil check-list; (2) the creativity rating scale.

A pilot study was carried out in Egyptian schools to ensure that the tests were reliable and valid for the study. The reliability and validity coefficients of the tests were found to be adequate.

Six schools were selected out of eleven public preparatory schools in which to conduct the empirical work. Three of these schools were for boys and three for girls. It was believed that there would be no significant differences in terms of ability between students attending these six schools and students at other schools, since the enrolment system in all the schools depends upon students' marks in the primary certificate and upon the areas where the students are living.

In each one of the six schools, one class of the second year was randomly selected to be included in the sample. The total number of the students' sample was 230, 110 boys and 120 girls. This number represents approximately 15% of the whole population of second-year students in all these six schools, and about 8% of the whole population of second-year students in all the public preparatory schools in the city. Table 1 shows the number of second-year classes in each of the eleven public schools, each of which contained roughly 40 students. Table 2 indicates the number of classes in each one of the six schools and the number of students in each selected class.

Table 1: Public preparatory schools and number of second-year classes in each in El-Fayoum City*

School	Number of second-year classes
Boys' Schools	
School 1	12
School 2	4
School 3	4
School 4	10
School 5	4
School 6	4
Girls' Schools	
School 7	11
School 8	5
School 9	3
School 10	7
School 11	7
	71

* These figures are taken from official statistics for 1983-4 prepared by the section of the education authority in El-Fayoum responsible for preparatory education.

Table 2: Number of second-year preparatory classes in the six schools of the empirical study and number of students in each selected class

School	Number of second-year classes	Number of students in each selected class
Boys' Schools		
School A	12	47
School B	4	35
School C	4	28
Girls' Schools		
School D	11	39
School E	5	45
School F	3	36
	39	230

The fieldwork also involved giving a questionnaire to a sample of one hundred preparatory teachers and a rating scale of creativity to

the students' teachers of Arabic and drawing. The first of these questionnaires was a check-list which contained sixty-two characteristics, sixty of which were found in empirical studies of the personality traits of creative people. The teachers were asked to express their views concerning these characteristics, approval or disapproval, in order to see whether their views corresponded or otherwise with those of experts on creativity. The second questionnaire was a rating scale on which the teachers were requested to rate their students' creativity. In informal meetings with these teachers, the present researcher explained to them the concept of creativity and its relationship with students' performance in schools. This discussion was helpful to clarify the issue to these teachers. This experiment was carried out in recognition of the teacher's role in encouraging and identifying creative students.

The Tests

The following tests were administered to the sample of students:

1 - Group Inventory For Finding Interests (GIFFI I), Level 1, - Grades 6 to 9 (see Appendix I).

2 - The Nowicki-Strickland Locus of Control Scale (see Appendix IV).

3 - The Pictorial Intelligence test (see Appendix V).

The following questionnaires were given to samples of teachers:

1 - The Ideal Pupil check-list (see Appendix II).

2 - Teachers' Rating Scale of Creativity (see Appendix III).

1: The Group Inventory For Finding Interests Level 1 (GIFFI I)

The GIFFI I is a personality inventory designed by Rimm and Davis (1980) for junior high-school students, which can be used for measuring creative characteristics. By means of a series of empirical studies the designers of this inventory have shown that personality

characteristics and biographical information are good predictors both of potentially creative primary school children (Rimm, 1980) and of potentially creative secondary school students (Davis and Rimm, 1982).

The GIFFI I inventory includes the following subscales: (1) creative writing and arts; (2) challenge, inventiveness; (3) confidence; (4) imagination; (5) many interests; (6) the total score.

The GIFFI I inventory is an easy-to-administer instrument which has been developed on the basis of research findings regarding the traits of creative people. On the basis of this approach, the inventory was designed for measuring personality characterisitics found to be related to creativity. Traits such as self-confidence, independence, adventurousness, curiosity, humour, attraction to complexity and mystery and background of creative hobbies and activities were included in the inventory. This inventory uses a five-point rating scale: 'No'; 'To a small extent'; 'Average'; 'More than average'; 'Definitely'. In the present research the students were asked to rate each of the sixty personality characteristics included in the inventory according to the degree to which they felt they possessed it. Table 3 shows some sample items and the kinds of characteristics they measure.

Table 3: Sample items from the personality inventory GIFFI I: from Davis and Rimm, 1982

Item	Trait
I have a good sense of humour	Sense of humour
I have had lots of hobbies	Wide interests
I like to write stories	Creative activity
I like to invent things	Creative activity
I would like to know more about things	Attraction to

like flying saucers, witchcraft and ghosts	complexity and the mysterious
I like to try new activities and projects	Interest in new ideas and activities
I often think about what is right and what is wrong	Reflectiveness
I make up games, stories, poems, or art-work more than other students do	Creative activities
When something I want to do gets hard, I give up and try something else*	Energy, task commitment
I always like to play with friends, but never alone*	Need for privacy
I have taken art, dancing or music lessons outside of school because I want to	Aesthetic, creative activities
I like to take things apart to see how they work	Curiosity

* Negatively related to creativity.

Rimm and Davis (1980) and Rimm et al. (1982) have presented information regarding the reliability and validity of the GIFFI I inventory. This information showed that this inventory is an adequate instrument for assessing creative personality characteristics in potentially creative junior high school students, especially when other criteria are used with it.

Hoyt reliability correlation coefficients were computed and were found to be quite high. The range of these correlations was from .88 to .91; samples of sixth, seventh and eighth grade students were used. The criterion-related validity was calculated by correlating the GIFFI I scores with a composite score including teachers' ratings of creativity on a five-point scale. The media coefficient was 0.35 (P 0.01). Most of the validity coefficients are acceptable (Davis and Rimm, 1982).

The content validity of the GIFFI I inventory was established by including items which indicate personality traits of creative people as measured by other tests of creativity. Among these tests were the Getzels and Jackson tests, the Torrance tests, and the GIFT. The main personality characteristics included in the GIFFI I inventory are independence, curiosity, perseverance, flexibility, multiplicity of interest, risk-taking, and sense of humour. The designers also indicated that item analysis supported the hypothesis that all items assess elements of the same basic trait. The scores on the GIFFI I were found not to increase systematically with age, as in the case of achievement or ability scores. This finding was interpreted by the designers as an indication that creative potential may be related to personality traits more than to intelligence. Finally, when the inventory was applied in Australia the designers found that the Australian samples obtained almost the same scores as had the American samples. This finding may suggest that creative potential is similar in these countries and may support the usefulness of the inventory in cross-cultural research.

The GIFFI I inventory was given to the students in groups. The translation into Arabic was found to be accurate. There was no time-limit for the administration of the inventory. Most of the students answered the inventory within fifteen minutes. The instructions explained the procedure for completing the rating scales. It was also emphasized, 'There are no right or wrong answers. We only want to know how you think and how you feel about things.' The inventory, after having been completed by the students, was retranslated into English and sent to Dr S. Rimm in the Educational Assessment Service in Watertown for computer scoring, as had been

agreed.

In the pilot study the GIFFI I inventory was given to a group of students (n = 30). Then after a three-week period the same group of students answered the test. A reliability coefficient of 0.88 ($P < 0.01$) (First application M = 187, SD = 18.64 and second application M = 182, SD = 19.11) was obtained between the scores of the first application and the scores of the second. The criterion-related validity was calculated using the GIFFI I scores and the total score of the teachers' ratings of students' creativity (n = 24) in Arabic and drawing. The value of the obtained correlation was r = 0.950 significant at the 0.001 level (for the GIFFI I scores M = 164.38 and SD = 24.47 and for the ratings M = 2.71 and SD = 1.513.

The scores of the total sample of students (n = 230) on the GIFFI I inventory were factor analysed. Table 4 presents the correlation matrix which was obtained by correlating the GIFFI I scores (subscales and total scores) of the whole sample of students. All correlations were significant except that between the subscale which measures confidence and the sub-scale which measures imagination. The value of this correlation was -0.0034. It seems that each subscale measures a different aspect of personality. Table 4 shows the matrix of correlation between the GIFFI I inventory subscales and total score in the sample of students (n = 230).

Table 4: Matrix of Correlation between the GIFFI I inventory subscales and total score (n = 230)

	Creative Writing and Arts	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
Creative Writing and Arts						
Challenge-Inventiveness	0.222 P= 0.000					
Confidence	0.1196 P= 0.035	0.1117 P= 0.046				
Imagination	0.1745 P= 0.004	0.1906 P= 0.002	-0.0034 P= 0.480			
Many Interests	0.4672 P= 0.000	0.4859 P= 0.000	0.2106 P= 0.001	0.2638 P= 0.000		
Total Score	0.6039 P = 0.000	0.7343 P=0.000	0.3632 P=0.000	0.4778 P=0.000	0.8495 P=0.000	

Interesting results were found using Factor Analysis. Factor analysis extracted two factors which were named as follows:Factor 1, 'Interests', which is an intellectual factor; and Factor 2, 'Confidence', which is an emotional factor. Table 5 shows the results of factor analysis of the GIFFI I inventory.

Table 5: Results of factor analysis of the GIFFI I inventory (subscales and total) using a sample of 230 preparatory school children

Varimax Rotated Factor Matrix

GIFFI I subscales and total scores	Factor 1	Factor 2
1 - Creative writing and arts	0.49920	0.08469
2 - Challenge - Inventiveness	0.46185	0.26079
3 - Confidence	0.09843	0.36838
4 - Imagination	0.30184	0.09320
5 - Many interests	0.86365	0.30152
6 - Total score	0.22464	0.69804

Transformation Matrix

	Factor 1	Factor 2
Factor 1	0.83657	-0.54786
Factor 2	-0.54786	0.83657

2: The Nowicki-Strickland Locus of Control Test

This test was developed by Nowicki and Strickland (1973) as a scale of generalized expectancy of reinforcement for children. The test consists of forty questions which are answered either yes or no by putting a mark next to the question (see Appendix IV). There are no right or wrong answers -an answer will be considered right only if it is expressing the respondent's real feeling. The test aimed at covering a variety of situations and personal interactions.

A high score on the Nowicki-Strickland test indicates external control orientation whilst a low score indicates internal orientation. Examples of test questions are as follows: 'Do you think that most problems will solve themselves if you just don't fool with them?'; 'Do you believe that you can stop yourself from catching a cold?'

The test is scored as follows: the answers which indicate external orientation take scores, one point for each item, and those which indicate internal orientation take no scores. Table 6 shows the

key for correction for the Nowicki-Strickland test.

There is no time-limit for the administration of the Nowicki-Strickland test. Persons can usually answer this test within 15-25 minutes, excluding the time needed for reading the instructions and answering the examples. In the present research, students took about 30 minutes to answer the test.

Table 6: The key for correction for the Nowicki-Strickland Locus of Control test

Question	Answer	Question	Answer
1	Yes	21	Yes
2	No	22	No
3	Yes	23	Yes
4	No	24	Yes
5	Yes	25	No
6	No	26	No
7	Yes	27	Yes
8	Yes	28	No
9	No	29	Yes
10	Yes	30	No
11	Yes	31	Yes
12	Yes	32	No
13	No	33	Yes
14	Yes	34	No
15	No	35	Yes
16	Yes	36	Yes
17	Yes	37	No
18	Yes	38	No
19	Yes	39	Yes
20	No	40	No

Studies using a variety of samples have supported the utility and validity of the Nowicki-Strickland test. The scores on this test appear to be related to a variety of behaviours, such as grade-point average, achievement, academic competence, delay of gratification and adjustment.

Evidence of construct validity as measured by relationships with achievement, intelligence, social status and parental educational level is presented in Nowicki and Strickland (1973). The designers also reported that item analysis helped to establish a homogeneous scale. Evidence of the reliability and validity of the test presented by Nowicki and Strickland showed that this test is adequate for measuring the variable of control. Table 7 shows the means and standard deviations of the Nowicki-Strickland test as reported by the designers. Scores seem to decrease as age increases. In the present research, the average for the total sample was 13.61 ($n = 230$, $SD = 3.43$); for males it was 13.32 ($N = 110$, $SD = 3.67$), and for females 13.88 ($n = 120$, $SD = 3.19$).

Table 7: Means and Standard Deviations of the Nowicki - Strickland Locus of Control Test Scores for Males and Females in Experimental Sample Grades Three to Twelve from Nowicki and Strickland, 1973

Grade	Males			Females		
	M	SD	N	M	SD	N
3	17.97	4.67	44	17.38	3.06	55
4	18.44	3.58	59	18.80	3.63	55
5	18.32	4.38	40	17.00	4.03	41
6	13.73	5.16	45	13.32	4.58	43
7	13.15	4.87	65	13.94	4.23	52
8	14.73	4.35	75	12.29	3.58	34
9	13.81	4.06	43	12.25	3.75	44
10	13.05	5.34	68	12.98	5.31	57
11	12.48	4.81	37	12.01	5.15	53
12	11.38	4.74	39	12.37	5.05	48

M = mean
SD = standard deviation
N = number of subjects

The reliability and validity of the Nowicki-Strickland test using Egyptian samples

The reliability of the test:

The Nowicki-Strickland test was given to 100 second-year students in the preparatory school. The reliability coefficient was 0.74 (P 0.01). Using the split-half method the coefficient was 0.79 (P 0.01). These two values indicate that the test is a reliable tool for measuring the locus of control within an Egyptian context. Using American samples (ages 8-11 years) and a test-retest method with a

period of 6 weeks, Nowicki and Strickland found a reliability coefficient of 0.67. While with subjects whose ages ranged from 12-15 years the reliability coefficient was 0.75. They also reported correlation coefficients ranging from 0.68 to 0.81 using the split-half method.

The Validity of the test

Judges Validity

The Nowicki-Strickland locus of control test was given to five staff members working in the Department of Psychology in Cairo University. The concept of the locus of control was discussed with them. Each one of the five was asked to answer the test in the external direction. All agreed that twenty-three questions should be answered positively and seventeen negatively (see Table 6).

Predictive Validity

The Nowicki-Strickland locus of control test was administered to a sample of students (n = 130) who were in the first, second or third year of preparatory school. The means and standard deviations of these students' scores on the test are presented in Table 8.

Table 8: Means and Standard Deviations of a Sample of Preparatory School Students' (n = 130) Scores, Years 1 to 3, on the Nowicki- Strickland Locus of Control Test

Preparatory School Year	Number	Age	Mean	Standard Deviation
1	52	13	13.9	4.23
2	34	14	13.4	3.58
3	44	15	12.2	3.75

Table 8 shows that scores on the Nowicki-Strickland test, using Egyptian preparatory school students, become more internal with increasing age. This finding is consistent with other findings e.g. those presented in Joe, 1971, Rotter, 1966, and Nowicki and Strickland, 1973, which indicate that the external orientation generally decreases with increasing age. This change towards internality could be explained by the fact that people's perceptions of their own abilities and characteristics, along with their self-confidence, increase with age.

Evidence presented here regarding the reliability and validity of the Nowicki-Strickland test using samples of Egyptian students suggests that the test is appropriate for use with Egyptian children.

3: The Pictorial Intelligence Test

The Pictorial Intelligence test is a standard Egyptian test which was developed by A. Saleh (see Appendix V). This test consists of sixty pictures which are familiar to Egyptian students. There are five pictures in each row. Four of these pictures have a common relationship, and one of them is different. The subject is required to find out which is the different one and mark it. The test is intended to measure the general intellectual ability of children aged eight to seventeen years. Each subject's score is the total number of correct answers. The test has proven a useful instrument in primary diagnosis. It has the following advantages:

1. It is a non-verbal test, and so it can be applied regardless of the educational level of the children answering it.
2. It extends over a long period since it can be used with a

wide variety of ages (8-17).

3. It is a group-administered test.

The reliability of the test was measured by means of analysis of variance and split-half methods. These coefficients ranged from 0.75 to 0.85. The validity of the Pictorial Intelligence test was verified with other criterion measures.

The correlations of the Pictorial Intelligence test with other Egyptian intelligence tests were as follows:

Meaning of words	0.20 (N = 300)	0.136 (N = 400)
Perception of meanings	0.47	
Thinking	0.24	0.280
Numbers	0.24	0.129
General ability	0.34	0.259
Figures classification		0.177
Numbers classification		0.213
Mental treatment		0.136

These coefficients are significant at the .05 level (Saleh, 1978).

Using factor analysis in which the test was included with 18 other tests, it was found that the Pictorial Intelligence test was saturated with the general factor by 0.48 (Saleh, 1978). In another study, conducted by M. Unan, it was found that the saturation of the test by the general factor using the oblique rotation was 0.61 (Saleh, 1978). Also, A. Kazim obtained a value of 0.36 using the orthogonal rotation and of 0.34 using the oblique rotation (Saleh, 1978).

In a reliability study conducted by the present researcher, the Pictorial Intelligence test was given to a group (n = 35) of second-

year preparatory school pupils. After a month the test was answered again by the same group. The scores of the two applications were correlated. The test-retest reliability coefficient between these two sets of test scores was 0.82 ($P < 0.01$).

The Pictorial Intelligence test was used in this study to investigate whether there were any relationships in the research's sample between intelligence and creative characteristics, on the one hand, and between intelligence and the locus of control on the other.

The following two tests were given to Egyptian teachers: (1) The Ideal Pupil Check-list; (2) Teachers' rating scale of creativity.

1. The Ideal Pupil Check-list

An important means by which a culture encourages or discourages creativity is through the rewarding or punishing by teachers of certain personality characteristics in students. If we could determine what traits teachers tend to encourage or discourage we should be able to examine their views regarding creativity. The present study is concerned with answering the following questions: (1) What do Egyptian teachers believe are the most desirable and least desirable traits of the ideal student?; (2) How do their perceptions compare with those of experts on the creative personality?

The Ideal Pupil check-list (see Appendix II) was developed by Dr Paul Torrance. This check-list consists of sixty-two personality traits. Sixty of these traits were found by empirical research to distinguish between high and low creative persons.

The check-list was given to one hundred Egyptian teachers along

with the following instructions:

> To guide a child to the highest fulfilment of his potentialities, what characteristics or behaviour should be encouraged and discouraged? Indicate your ideas using the list below: (1) Check ( ) each characteristic or behaviour that you think should be encouraged; (2) double check ( ) each characteristic or behaviour that you think should be especially encouraged; and (3) strike through each characteristic or behaviour that you think should be discouraged.

The data obtained by this instrument was assessed as follows:

Double-check	=	2 points
Check	=	1 point
Strikeout	=	-1
Unmarked	=	0

The results on the check-list were compared with samples of American teachers.

*On the basis of this finding these teachers were used in the main study. In this study's analysis the teachers' average of the two ratings (in Arabic and Drawing) were rounded up to the next whole number (see Appendix VII). This paragraph is in p. 228.

2.Teachers' rating scale of creativity

Egyptian teachers of Arabic and drawing were asked to rate their students' creativity using the following scale:

A	Highly creative
B	Above average creativity
C	Average creativity
D	Below average creativity
E	Not creative

These letters were subsequently changed to the following scores: A=5, B=4, C=3, D=2, E=1

A total creativity score was calculated for each student in the sample using the rounded up average of his/her ratings in the two subjects (Arabic and drawing) (see Appendix III). A teacher of Arabic rated the student's creativity and a teacher of Drawing rated the same student's creative potential. In the pilot study (see p.211) a test-retest reliability coefficient was calculated for each teacher in order to examine his objectivity in rating the students creativity. The period between the two assessments was three weeks.

These coefficients are presented in Table 9 at the end of the chapter (see p.230). All these coefficients are significant at the 0.001 level.* p. 227

The Procedures

The pilot study showed that the Group Inventory For Finding Interests (GIFFI I), the Nowicki-Strickland Locus of Control test and the Pictorial Intelligence test were appropriate for use in this study.

The tests were given by the researcher to the students in the following order:

1. The Group Inventory For Finding Interests (GIFFI I)
2. The Nowicki-Strickland Locus of Control test
3. The Pictorial Intelligence Test

The following two instruments were administered to the teachers: (1) The Ideal Pupil check-list; (2) The Teachers' Rating Scale of Creativity. These two instruments were introduced to the teachers in informal meetings in schools. During these meetings the concept of creativity and the personality characteristics of creative people were discussed.

The present researcher applied the tests following their

instructions and considered carefully the intervening variables which would affect students' performances on the tests in order to ensure suitable conditions for the answering of the tests.

All the tests, except the GIFFI I inventory, were scored by the researcher. The GIFFI I inventory was retranslated from Arabic into English and sent to Dr S. Rimm in the Educational Assessment Service in Watertown, Wisconsin, for computer analysis, as had been agreed. The inventory was scored by the EAS computer and returned to the researcher.

The data was analysed at the computer unit in the University of Durham. The SPSS (Statistical Package for Social Science) computer program was employed for analysing the data. A variety of statistical techniques, e.g. frequency, correlation coefficients, crosstabs, analysis of variance and factor analysis were used in the analysis of data. The locus of control variable was treated as the independent variable and the creativity scores were treated as the dependent variables.

Table 9: Reliability Coefficients of the Teachers' Ratings

Correlation coefficients (test retests) of the Teachers' Ratings.

Number	Arabic Teachers	Drawing Teachers
1	r=0.906 1st Assessment:M=2.35,SD=1.312 n=20 2nd Assessment:M=2.15,SD=0.96	r=0.931 1st Assessment:M=2,SD=0.978 n=23 2nd Assessment:M=1.957,SD=0.857
2	r=0.904 1st Assessment:M=1.96,SD=1.12 n=23 2nd Assessment:M=1.78,SD=0.970	r=0.891 1st Assessment:M=2, SD=1.27 n=22 2nd Assessment:M=1.91,SD=0.945
3	r=0.911 1st Assessment:M=1.68,SD=0.837 n=25 2nd Assessment:M=1.72,SD=0.77	r=0.931 1st Assessment:M=2.08,SD=1.174 n=23 2nd Assessment:M=1.82,SD=1.009
4	r=0.956 1st Assessment:M=1.83,SD=1.067 n=18 2nd Assessment:M=1.72,SD=0.985	r=0.941 1st Assessment:M=2.17,SD=1.178 n=24 2nd Assessment:M=2.08,SD=1.153
5	r=0.926 1st Assessment:M=1.91,SD=1.122 n=22 2nd Assessment:M=1.91,SD=0.994	r=0.977 1st Assessment:M=2.17,SD=1.179 n=24 2nd Assessment:M=2.08,SD=1.039
6	r=0.868 1st Assessment:M=1.83,SD=0.916 n=24 2nd Assessment:M=1.83,SD=0.8	r=0.913 1st Assessment:M=2.04,SD=0.978 n=24 2nd Assessment:M=1.91,SD=1.086

All these correlations are significant at the 0.001 level.
These figures are for the pilot study only.
M= the average of the creativity ratings for the sample of students in all the above assessments.

Chapter Eight

Presentation and Analysis of Data

This chapter incorporates, firstly, the results of the tests which were given to the sample of preparatory school students (n = 230). These tests were:

(1) the Group Inventory For Finding Interests (GIFFI I);

(2) the Nowicki-Strickland locus of control test;

(3) the Pictorial Intelligence test.

The students were also rated in terms of their creative performance by their teachers of Arabic and drawing. A total score of creativity for each student, based on the ratings of two teachers (of Arabic and of drawing) in each of the six schools, is included in the study.

Secondly, the data given here includes information obtained from a sample of Egyptian preparatory school teachers (n = 100) using their responses on the Ideal Pupil Check-list.

The following hypotheses were examined in the present research:

(1) That there would be a significant relationship between creativity (as measured by the GIFFI I inventory and the teachers' ratings) and internal locus of control (as measured by the Nowicki-Strickland test).

(2) That there would be significant sex differences on the creativity measures (as measured by the GIFFI I inventory and the teachers' ratings of creativity) and the locus of control (as measured by the Nowicki-Strickland scale).

(3) That there would be a significant relationship between intelligence (as measured by the Pictorial Intelligence test) and creativity (as measured by the GIFFI I inventory and the teachers' ratings).

(4) That there would be significant correlation between internal

locus of control (as measured by the Nowicki-Strickland test) and intelligence (as measured by the Pictorial Intelligence test).

(5) That the concept of the ideal pupil held by a group of Egyptian teachers (as measured by the Ideal Pupil check-list) would not be consistent with that of experts on the creative personality.

The first of these hypotheses assumed a significant relationship between creativity and internal locus of control. This hypothesis was examined by:

(a) calculating the correlation coefficient between the scores on the creativity inventory (GIFFI I) and the Nowicki-Strickland locus of control test for the whole sample of students, for the boys' sample and for the girls' sample; carrying out the analysis of variance for the total GIFFI I scores of the internal and external control students.

(b) calculating the correlation coefficient between the scores of the whole sample of students on both the ratings of creativity and the Nowicki-Strickland I-E control scale.

The data regarding the first hypothesis was as follows: First, when the scores of students on the GIFFI I inventory were correlated, negligible correlations were found between these scores. Table 10 presents the correlation coefficient between the scores on the inventory and the I-E control test in the whole sample of students (n = 230).

Table 10: Coefficient of correlations* between the scores on the GIFFI I inventory and the Nowicki-Strickland test of the whole sample of students (n = 230)

	The GIFFI I creativity inventory					
	Creative Writing	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
The Nowicki-Strickland I-E Test	- 0.01	-0.01	-0.091	-0.087	-0.022	-0.013

* All correlations are non-significant.

Interestingly, however, when the scores on the creativity inventory GIFFI I were correlated with the scores on the Nowicki-Strickland I-E test in the sample of boys (n = 110), a positive, low but significant correlation (0.141, significant at 0.07 level) between locus of control and 'Imagination', a subscale of the creativity inventory, was found. This could mean that there was a correlation between external locus of control and imagination in the sample of boys. Table presents the correlation coefficients between the GIFFI I scores and the I-E scores in the sample of boys.

Table 11: Correlation coefficients between the GIFFI I inventory and the Nowicki-Strickland test scores in the boys' sample (n = 110)

	The GIFFI I Creativity Inventory					
	Creative Writing	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
The Nowicki Strickland I-E test	0.031	0.071	-0.079	0.141*	0.028	0.066

* significant at 0.07 level

In addition, when the scores on the creativity inventory (GIFFI I) were correlated with the scores on the Nowicki-Strickland I-E scores in the girls' sample (n = 120), a negative, low but significant coefficient (at 0.05 level) between the 'Confidence' subscale of GIFFI I and I-E control was obtained. The value of this correlation was -0.145 (significant at 0.05 level). This means that there was a correlation between internal control and confidence in the sample of girls. Table 12 presents the correlation coefficient between the GIFFI I scores and the O-E scores in the sample of girls.

Table 12: Correlation coefficients between the GIFFI I inventory and the Nowicki-Strickland test scores in the girls' sample (n = 120)

	The GIFFI I Creativity Inventory					
	Creative Writing	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
The Nowicki-Strickland I-E test	-0.066	-0.051	-0.145*	0.033	-0.077	-0.095

* significant at 0.05 level

Secondly, the students were divided into an internal locus of control group and an external locus of control group. This was done by using the average score of the sample of students on the Nowicki-Strickland test as the cut-off point. The average and standard deviation of the students' scores on the Nowicki-Strickland locus of control test were 13.61 and 3.43 respectively. The internal locus of control group (n = 115) included students who had scored below the mean on the test. The external group (n = 115) involved students whose scores were above the mean on the test. The analysis of variance was performed to examine the differences between these two personality groups (internals and externals) in their performance on the GIFFI I inventory (total score). In this analysis, the independent variables were the personality types (internals and externals) and sex, and the dependent variable was the GIFFI I total scores. The results of this analysis indicated no significant differences between the two groups or between sexes, and no interaction effects. Table 13 summarizes the results of the analysis of variance.

Table 13: Summary of Analysis of Variance of the total GIFFI I scores of two Personality Groups: Internal Group of Students and External Group of Students using the whole sample of students (n = 230)

Source of Variation	Sum of Squares	DF	Mean Square	F	Significance of F
Main effects	528.091	2	264.045	0.602	0.548
Personality types	28.387	1	28.387	0.065	0.799
Sex	513.965	1	513.965	1.173	0.280
Two-Way interaction	655.870	1	655.870	1.496	0.223
Personality types sex	655.870	1	655.870	1.496	0.223
Explained	1184.000	3	394.667	0.900	0.442
Residual	99065.188	226	438.341		
Total	100249.188	229	437.769		

Finally, the ratings of students' creativity (given by their teachers) were correlated with students' scores on the Nowicki-Strickland locus of control test. A negative significant correlation (-0.512, $p < 0.001$) was obtained between the two variables. This correlation shows that internal locus of control is related to creativity ratings in this sample of students. The average of the creativity ratings in the whole sample of students was 3.29 with a standard deviation of 1.07. The average of the locus of control in the whole sample of students was 13.61 with a standard deviation of 3.43.

The first hypothesis, concerning the relationship between creativity and internal locus of control in the present sample of preparatory schoolchildren, was thus strongly confirmed when the creativity ratings were correlated with the I-E scores. When, however, the scores on the creativity inventory (GIFFI I) were correlated with the I-E scores, no significant correlations were found. Only when the scores on the two tests for the two groups of students (boys and girls) were correlated were some interesting findings obtained. In the boys' sample, 'Imagination', a subscale of GIFFI I, was correlated with external control ($r = 0.141$, significant at 0.07 level). In the girls' sample, 'Confidence', a subscale of GIFFI I, was correlated with internal control ($r = -0.145$, significant at 0.05 level). Analysis of variance, however, did not show any differences between the internal and external locus of control students in their performance on the creativity inventory ($n = 230$). In view of the uncertain validity of the GIFFI I inventory, the present researcher judges that the ratings were more accurate in assessing students' creativity than were the scores on this inventory.

Previous studies which sought to examine the relationship between creativity and locus of control in children generally indicated a possible relationship between these two constructs.

Poole, Williams and Lett (1977), using a sample of urban sixth-grade children, found significant differences of urban on locus of control scores between the highly creative group and the control group. The researchers indicated certain limitations, however, regarding their method of identifying creative children.

MacGregor (1964) found that children with internalized role perception scored significantly higher than those in the mixed group, or those with an externalized role perception, on originality measures. Her sample comprised highly intelligent children.

Houtz, Denmark, Rosenfield and Tetenbaum (1980), investigating a sample of highly intelligent children (the average IQ was 139), found that highly fluent group was more tolerant of ambiguity, more internally oriented and higher in self-esteem than the other groups.

Churchill (1976) found a significant correlation between creativity and moderate internality in a sample of junior high school students.

Cohen and Oden (1974) examined the relationship between creativity and locus of control in a sample of kindergarten and second grade children. Among second grade female subjects, creativity scores were significantly correlated with locus of control scores. Among kindergarten boys, however, locus of control scores were negatively correlated with creativity measures.

Du Cette, Wolk, and Friedman (1972) studied the relationship of locus of control and creativity in a sample of black and white

schoolboys (9-11 years). Creativity was measured by 'Pattern Meanings', a test developed by Wallach and Kogan. This test produced three scores: fluency (the total number of responses emitted); creativity (the uniqueness of the responses); and creative efficiency (a ratio produced by dividing fluency by creativity). As predicted, internal locus of control children gave more creative responses than external control children and were more efficient.

Lotsof and Steinke (1973) investigated the relationship, in a sample of junior high school students, between divergent thinking and levels of abstractness and locus of control. This study did not find any relationship between these variables.

The present research thus gives some support to the theory that there is a relationship between creativity and I-E control in children. However, these results should be viewed within the limits that they are not generalizable. It seems that the relationship between these constructs might appear stronger in actual creative people who have already produced creative works than within samples of potentially creative children. More effective tests of creativity are needed in order to assess creativity correlates in children.

The second hypothesis anticipated differences between the boys and the girls on: (a) the creativity measures (the GIFFI I inventory scores and the students' ratings of creativity carried out by the teachers); (b) the locus of control scores as measured by the Nowicki-Strickland test. The results were as follows:

(a) there were no significant differences between the boys and the girls on the GIFFI I inventory. Table 14 presents the mean and standard deviation of the scores of boys and girls on the inventory total score.

Table 14: Mean and standard deviation of the total GIFFI I score of the boys and girls

GIFFI I Total Score	Boys (n = 110)	Girls (n = 120)
Mean	189.51	186.56
Standard Deviation	22.41	19.45

In addition, this trend of non-significant sex differences in creativity was clear from the teachers' ratings of the students' creativity. Table 15 presents the mean and standard deviation of the creativity ratings in the boys and the girls.

Table 15: Mean and standard deviation of creativity ratings in boys and girls

Creativity Ratings	Boys (n = 110)	Girls (n = 120)
Mean	3.12	3.44
Standard Deviation	1.13	1.12

The present data seems to suggest that there were no significant sex differences on creativity measures. Findings in this area are not consistent in supporting the superiority of one sex over the other. The following are examples of studies which examined differences in creativity relating to sex. Torrance (1965) found that boys in grades one to three were superior to girls in the same grades on creativity tasks. This was explained by sex role identification and society's attitudes towards creativity. From the fourth grade on, however, Torrance found that this trend was reversed. Boys' creative

performance suffered a sharp drop, on verbal tasks in particular. Torrance explained this as a result of conformity to peer groups. In contrast to the above results, Torrance (1965), experimenting with sixth grade children, did not find any consistent sex differences on either verbal on non-verbal tests. Lynch (1970), investigating a sample of Irish high-school students, did not find any significant sex differences on either verbal or figural creativity measures. Check (1970), using a sample of 272 IQ-matched fourth, seventh and twelfth grade students, found no significant sex differences on measures of verbal and figural creativity. Dewing (1970), investigating a sample of Australian seventh grade children (n = 394), observed no sex differences with regard either to test scores or to creative performance. Kogan (1974) suggests that neither sex is at an advantage with regard to creativity potential:

> The evidence brought to bear in this essay is not devoid of value implications. To the degree that divergent-thinking tests have some predictive power for creative behaviour, it is important to know that male and females perform similarly. The dissemination of such knowledge would have the obvious function of dispelling sexist stereotypes concerning women's potential capacity for creativity.
>
> (p.11)

Finally, Bolen and Torrance (1978) write:

> A review of the relevant literature does not indicate any consistent relationships between sex and creativity measures.

Since the Egyptian revolution in July 1952, the Egyptian education system has been providing equal opportunities for both sexes in order to help both men and women find employment in different occupations. This policy has contributed a great deal to social change and modernization in the country's areas of development. Thus there has been an increasing awareness of the equality of the sexes in terms

of capacities and aptitudes. Such an awareness may have helped to foster more positive attitudes in Egyptian people towards the encouraging of creative behaviour in both sexes, in girls in particular.

The results on the GIFFI I inventory were compared with similar data for American and Australian children obtained on the same test. The average score of the Egyptian child was 187.97, with a standard deviation of 20.92. The average in American and Australian children ranged from 171 to 184 (see Rimm et al., 1982). The measurements of potential creativity obtained using this inventory seem to suggest that characteristics of potentially creative children in these countries are similar. This finding might also lend some support to the validity of the personality approach in assessing creative behaviour cross-culturally.

(b) The results also showed no sex differences on the Nowicki-Strickland I-E control test in the present sample of children. Table shows mean and standard deviation of the boys and girls scores on this test.

Table 16: Mean and Standard Deviation of the boys' and girls' scores on the Nowicki-Strickland I-E control scale

Nowicki-Strickland I-E scores	Boys (n = 110)	Girls (n = 120)
Mean	13.32	13.88
Standard Deviation	3.67	3.19

Bolen and Torrance (1978) reported that the literature did not show any consistent relationship between sex and I-E control measures. Examples of results in this area are as follows: Crandall and Katkovsky (1962) using Rotter's test found that high achievement was related to internality in males but not in females. Nowicki and Roundtree (1971) found that the scores on the Nowicki-Strickland test were related to achievement in boys and to extra-curricular activity in girls. A review by Joe (1971) presented findings showing that females were significantly more external than males on Rotter's I-E control scores. Finally, Phares (1976) wrote:

> There does not appear to be any way of summarizing sex differences on the I-E scale. Many studies do not report separate means for males and females. A wide majority of studies does not find significant differences in I-E scores between men and women... It is clear that sex often moderates the relationship between I-E scale scores and other behaviours. For example, internality often is related to a variety of achievement behaviour in males but not in females.
>
> (p.44)

Thus, the present data was not supportive of the second hypothesis, which was concerned with sex differences on creativity and the locus of control. As mentioned above, previous results in both areas indicated inconsistent conclusions.

The third hypothesis was that there would be significant correlations between creativity (as measured by the GIFFI I inventory and teachers' ratings) and intelligence (as measured by the pictorial test). This hypothesis was examined by: (a) Correlating the GIFFI I scores and the IQs of the total sample; (b) correlating the creativity ratings and the IQs of the whole sample as well. The results were as follows:

(a) There were no significant correlations between the GIFFI I scores and intelligence scores. Table 17 presents the correlation

coefficient between the GIFFI I scores and the IQs in the sample of children.

Table 17: Correlation coefficients* between the GIFFI I scores and Intelligence scores in the sample of children (n = 230)

	The GIFFI I creativity inventory					
	Creative Writing	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
The Pictorial Intelligence Test	0.04	0.07	0.02	0.01	0.06	0.07

* All correlations are non-significant.

In the boys' sample (n = 110), there was only a negative, low but significant correlation between 'Imagination', a subscale of the creativity inventory, and intelligence (r = -0.150, significant at 0.05 level). This correlation indicates that in the boys' sample high intelligence was related to low imagination and vice-versa. Table presents the correlation coefficients between the inventory's scores and intelligence scores in the group of boys.

Table 18: Correlation coefficients between the scores on the creativity inventory GIFFI I and the scores on the Pictorial Intelligence Test in the boys' sample (n = 110)

	The Creativity Inventory GIFFI I					
	Creative Writing Arts	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
Pictorial Intell-gence Test	0.059	0.053	0.036	-0.150*	0.064	0.034

* significant at 0.05 level

In the sample of girls (n = 120) there was a positive, significant correlation between Imagination, a subscale of the GIFFI I inventory, and IQ scores (r = 0.153, significant at 0.05 level). This correlation shows that high imagination was related to high intelligence in the girls' sample. Table 19 presents the correlation coefficients between the scores on the GIFFI I inventory and the Pictorial Intelligence Test in the sample of girls.

Table 19: Correlation coefficients between the scores on the creativity inventory GIFFI I and the scores on the Pictorial Intelligence Test in the girls' sample (n = 120)

	The Creativity Inventory GIFFI I					
	Creative Writing Arts	Challenge-Inventiveness	Confidence	Imagination	Many Interests	Total Score
Pictorial Intelligence Test	0.031	0.008	0.060	0.153*	0.062	0.093

* significant at 0.05 level

(b) There was also no significant correlation between the creativity ratings and the IQ scores in this sample of children (n = 230). The value of the correlation between the two variables was 0.012. The mean creativity rating of the sample was 3.29 with a standard deviation of 1.07, and the mean IQ of the sample was 104.96 with a standard deviation of 9.42.

The literature on the subject points to contradictory results regarding the relationship between creativity and intelligence. Getzels and Jackson (1962) found positive but low correlations between measures of divergent thinking and intelligence in a sample of

students. Wallach and Kogan (1965) found that in the sample of children they studied the mean creativity intelligence correlation was not significant ($r = 0.09$).

Madaus (1967) found that divergent thinking measures were independent of scores on convergent thinking tests in the sample of highschool students he investigated. Clarke (1968) found two negligible correlations in his sample of children between scores on the Minnesota tests of creativity and the NFER verbal reasoning scores. Hasan and Butcher (1966) found a relationship between creativity and intelligence in their sample of children.

Torrance (1967) found that the median of a total of 178 coefficients of correlation between measures of intelligence and a total composite measure of creativity was 0.20. When the composite score was divided into scores for verbal and figural creativity, median correlations of 0.21 for 88 studies of the former and of 0.006 for 114 studies of the latter were obtained. In a review undertaken by Vernon et al. (1977) of studies which had dealt with the relationship between divergent thinking and intelligence, findings generally indicate that this relationship varies to a large extent.

Iscoe and Pierce-Jones (1964), investigating a sample of children of whom 110 were white and 110 negro, found that the correlations between the WISC full scale IQs and divergent thinking scores (as measured by the Unusual Uses sub-test of the Torrance Tests of Creative Thinking) were 0.25 for the negro and 0.28 for white children. Both correlations were significant ($p < .05$).

Dacey et al. (1969) found that the correlation in a sample of secondary school students between divergent thinking scores (as measured by four sub-tests from the Torrance battery) and intelligence

scores (as measured by the AH4 group test of intelligence) was not significant. The value of the correlation was 0.08.

Dewing (1970) found that the correlation in a sample of secondary school children (n = 394) between the total creative thinking score (as measured by four tests from TTCT) and IQ on the ACER Intermediate Test D was 0.143 ($p < 0.05$).

Houtz et al. (1980), examining a group of gifted children (n = 80; average IQ = 139), found that the fluency tasks were relatively unrelated (0.05 to 0.33 with a mean equal to 0.19).

Mackinnon (1962) believes that creativity is dependent upon intelligence up to a certain level. Above that level, the two factors become independent: whether a person performs creatively is determined by nonintellective factors.

Cropley (1966) applied a battery of 13 tests, 6 convergent and 7 divergent, to 320 seventh grade children. Divergent thinking tests were scored for originality. The correlation between creativity and intelligence was 0.514. However, Cropley believes that it is wrong for us to assume that creativity is a separate basic intellectual mode. Cropley shows that divergent and convergent factors are partly interdependent, tests loading on the two orthogonal factors showing a strong overlap. He writes:

> The present findings suggest that it would be wrong to argue either that convergent and divergent thinking cannot be distinguished from each other factorially, as some authors have suggested, or that they are completely independent of each other as has been suggested by others... It is possible to compile a set of effective tests specifically to measure divergent thinking, but the factor underlying these tests bears an oblique, not an orthogonal, relation to the factor underlying intelligence tests of the convergent type. This point of view is further supported by the presence, before relation, of a large general factor, which accounted for 76 per cent of the common variance. It is unacceptable to think of creativity as a separate intellectual mode.

The above-mentioned studies concerning the relationship between creativity and intelligence put forward contradictory results. The present study found negligible correlations between creativity (as measured by the creativity inventory GIFFI I and teachers' ratings of students' creativity) and intelligence (as measured by a pictorial test). Thus, the third hypothesis was not confirmed by the present data.

The fourth hypothesis was that there would be significant correlation between internal locus of control (as measured by the Nowicki-Strickland I-E control) and intelligence (as measured by the pictorial test).

When the students' scores on the Nowicki-Strickland test and the pictorial test were correlated, a negligible correlation ($r = 0.023$) was found. Thus, the hypothesis was rejected. It appears that the two variables were independent in the present sample of Egyptian children. This result might also give some support to the validity of the I-E concept cross-culturally.

Previous findings reached the same conclusion; no significant relationship between the locus of control and intelligence has been demonstrated. For example, Rotter (1966) reported that correlations between intelligence measures and I-E scale scores are negligible, or at least low. Hersch and Scheibe (1967) also reported non-significant correlations from -0.07 to 0.17 for three different measures of intellectual ability. Milgram (1971) found non-significant correlations between locus of control and measures of scholastic achievement, non-verbal intelligence, and occupational aspiration in a sample of children. Nowicki and Roundtree (1971), using a sample of secondary school students, found that locus of control scores

predicted achievement for males but not for females, and yet were not related to intelligence test scores.

The fifth hypothesis states that the concept of the ideal pupil held by a group of Egyptian teachers will not be consistent with that held by experts on the creative personality. It stresses qualities of conformity instead of creativity. The results we obtained confirmed this hypothesis.

The data concerning the fifth hypothesis was obtained from a sample of 100 Egyptian preparatory school teachers. The concept of the ideal pupil was assessed by Torrance's (1975) check-list. this check-list involves sixty-two characteristics, sixty of which were found in empirical research to distinguish between high and low creative people. These characteristics were drawn by Torrance from over fifty empirical studies. Egyptian teachers in this research were requested to express their views about favourite and non-favourite behaviour of students by using the check-list. The teachers were given the following instructions in order to guide a child to the highest fulfilment of his potential:

What characteristics or behaviour should be encouraged or discouraged? Indicate your ideas, using the list below:

(1) Check each characteristic or behaviour that you think should be encouraged;

(2) Double-check each characteristic or behaviour that you think should be especially encouraged;

(3) Strike through each characteristic or behaviour that you think should be discouraged.

Each of the sixty-two characteristics in the check-list were

given one point for a single-check, two for a double check, and minus one for a strikeout. In this way, an index of desirability was obtained for each of the sixty-two characteristics. The characteristics were then ranked in terms of the values obtained, the characteristics with the highest value being ranked one, and so on. Table shows the rank-order of the characteristics included in the check-list according to the Egyptian teachers' responses. In Table 20 the responses of a sample of American teachers (Torrance, 1965) are included for comparison purposes.

Table 20: Rank-order of the responses of Egyptian and American teachers on the ideal pupil check-list

Characteristic	Egyptian Teachers (n = 100)	American Teachers (n = 264)
Adventurous	15	19
Affectionate	12	40
Altruistic	26	36
Always asking questions	54	38.5
Attempts difficult tasks	14	18
A self-starter	21	8
A good guesser	57	50
Bashful	55	57
Becomes preoccupied with tasks	25	41
Considerate of others	2	4
Critical of others	59	52
Courageous in convictions	31	15
Courteous	5	13
Curious	9	2
Competitive	24	31
Desires to excel	27	24.5
Determined	40	7

Characteristic	Egyptian Teachers (n = 100)	American Teachers (n = 264)
Domineering	42	61
Disturbs class organization and procedures	53	59
Does work on time	6	22
Emotional	48.5	54
Emotionally sensitive	44	42
Energetic	37	16
Fault-finding	58	58
Haughty and self-satisfied	43	62
Healthy	22	14
Independent in judgement	29.5	20
Independent in thinking	10	1
Intuitive	23	32
Industrious	1	5
Likes to work alone	60	43
Never bored	35	34
Nonconformist	61	48
Negativistic	50	60
Obedient	4	30
Popular, well-liked by peers	7	27
Persistent	41	12
Prefers complex tasks	33	37
Physically strong	13	38.5
Quiet	17	47
Receptive to ideas of others	3	6
Regresses occasionally	62	49
Reserved	52	46
Remembers well	32	24.5
Self-confident	16	11
Self-assertive	45	44
Self-sufficient	28	35
Sense of humour	14	3
Sense of beauty	29.5	23
Sincere	8	9

Characteristic	Egyptian Teachers (n = 100)	American Teachers (n = 264)
Spirited in disagreement	39	45
Strives for distant goals	34	21
Stubborn	46	55.5
Sophisticated	38	53
Timid	56	55.5
Thorough	20	10
Talkative	47	51
Unwilling to accept things on mere say-so	48.5	33
Visionary	51	26
Versatile, well-rounded	18	17
Willing to take risks	36	28.5
Willing to accept judgement of authorities	11	28.5

The ten characteristics most liked by Egyptian teachers were: (1) industrious; (2) considerate of others; (3) receptive to ideas of others; (4) obedient; (5) courteous; (6) does work on time; (7) well liked by peers; (8) sincere; (9) curious; and (10) independent in thinking. The ten characteristics which Egyptian teachers liked the least were: (1) likes to work alone; (2) regresses occasionally; (3) nonconformist; (4) critical of others; (5) fault-finding; (6) a good guesser; (7) timid; (8) bashful; (9) always asks questions; and (10) disturbs class organization.

In Torrance's (1965) study American teachers chose the following ten traits as the most important ones regarding the ideal pupil: (1) independent in thinking; (2) curious; (3) sense of humour; (4) considerate of others; (5) industrious; (6) receptive to ideas of others; (7) determined; (8) self-starter; (9) sincere; and (10) thorough. The ten least desirable traits chosen by American teachers

were: (1) haughty and self-satisfied; (2) domineering; (3) negativistic; (4) disturbs class organization and procedures; (5) fault-finding; (6) bashful; (7) stubborn; (8) timid; (9) emotional; and (10) sophisticated. Table 21 presents the most and the least valued traits of the ideal pupil given by Egyptian and American teachers.

Table 21 : The most valued and the least valued traits of the ideal pupil as perceived by the Egyptian and American teachers

	Most Valued Characteristics		Least Valued Characteristics	
	Egyptian Teachers	American Teachers	Egyptian Teachers	American Teachers
1.	Industrious	Independent in thinking	Likes to work alone	Haughty and self-satisfied
2.	Considerate of others	Curious	Regresses occasionally	Domineering
3.	Receptive to the ideas of others	Sense of humour	Nonconformist	Negativistic
4.	Obedient	Considerate of others	Critical of others	Disturbs class organization and procedures
5.	Courteous	Industrious	Fault-finding	Fault-finding
6.	Does work on time	Receptive to the ideas of others	A good guesser	Bashful
7.	Well liked by peers	Determined	Timid	Stubborn

	Most Valued Characteristics		Least Valued Characteristics
	Egyptian Teachers	American Teachers	Egyptian Teachers	American Teachers
8.	Sincere	Self-starter	Bashful	Timid
9.	Curious	Sincere	Always asks questions	Emotional
10.	Independent in thinking	Thorough	Disturbs class organization	Sophisticated

Finally, the responses of the Egyptian teachers on the ideal pupil check-list were combined with the responses of experts on the creative personality (see Table 22). The experts on creativity selected the following characteristics as being the ones they would most value in a creative person: (1) courageous in convictions; (2) curious; (3) independent in thinking; (4) independent in judgement; (5) willing to take risks; (6) intuitiveness; (7) becomes preoccupied with tasks; (8) persistence; (9) unwilling to accept things on mere say-so; and (10) visionary. When we compare these characteristics chosen by the experts with the characteristics given by the Egyptian teachers we find that the latter group selected only one trait, number ten, 'independent in thinking', which seems to suggest that this group of Egyptian teachers were not encouraging creative characteristics in students. Table shows that the experts on creativity selected the following as the least valued characteristics of the ideal pupil: (1) conformity; (2) willingness to accept the judgement of authorities; (3) fearfulness; (4) timidity; (5) obedience; (6) courtesy; (7) promptness; (8)

socially well adjusted; (9) haughty; and (10) neatness and orderliness. In fact, the group of Egyptian teachers, in their responses on the check-list, did not favour many characteristics which distinguish creative from non-creative individuals. The following characteristics were not favoured by the Egyptian teachers, and they are important in creativity: (1) likes to work alone; (2) regresses occasionally; (3) nonconformist; (4) critical of others; (5) a good guesser; (6) always asks questions; and (7) disturbs class organization. In general the comparison seems to indicate that the group of Egyptian teachers questioned were not in favour of characteristics which are those of the creative personality. The Egyptian education authorities might consider this conclusion well in relation to teacher training. Table presents the most and the least valued characteristics of the ideal pupil as perceived by the experts on creativity and the group of Egyptian teachers.

Table 21: The most valued and least valued characteristics of the ideal pupil as perceived by experts on creativity and a group of Egyptian teachers

Most Valued Characteristics		Least Valued Characteristics	
Experts on Creativity	Egyptian Teachers	Experts on Creativity	Egyptian Teachers
1. Courageous in convictions	Industrious	Conformity	Likes to work alone
2. Curious	Considerate of others	Willingness to accept the judgement of others	Regresses Occasionally

Table 22 (Continued)

3. Independent in thinking	Receptive to the ideas of others	Fearfulness	Nonconformist
4. Independent in judgement	Obedient	Timidity	Critical of others
5. Willing to take risks	Courteous	Obedience	Fault-finding
6. Intuitiveness	Does work on time	Courtesy	A good guesser
7. Becomes pre-occupied with tasks	Well liked by peers	Promptness	Timid
8. Persistence	Sincere	Socially well adjusted	Bashful
9. Unwilling to accept things on mere say-so	Curious	Haughty	Always asks questions
10. Visionary	Independent in thinking	Neatness and orderliness	Disturbs class organization

The emphasis placed by the group of Egyptian teachers upon industriousness as the most valued characteristic of the ideal pupil is perhaps associated with their great concern for academic achievement during the school years. But such concern has little to do with the fact that creative children need more time for thinking, gathering information, experimenting, formulating hypotheses, finding the solution, and communicating ideas. Literature has shown that creative people are those who have developed the habits of reflecting deeply and involving themselves deeply in their work.

The present group of Egyptian teachers put being considerate towards others, receptivity to the ideas of others, being obedient, and courteousness in second, third, fourth, and fifth place respectively. The studies reviewed above have shown that creative people are receptive to others' ideas, whilst at the same time being careful to examine such ideas carefully before accepting them. On this basis, the characteristics chosen by the teachers are not consistent with independence of thought and action, which is considered by the experts on creativity as an essential trait in creative people. Creative people have to be characterized by independent thinking in order to discover original solutions to problems.

The sixth trait chosen by the group of Egyptian teachers as needing to be encouraged in students was 'does work on time'. This choice again indicates that the teachers were more concerned with school achievement than with creativity traits. In most preparatory schools in Egypt, examinations represent the main means of giving pupils grades. Aspects of originality and creativity are not of much concern; rather, achievement in a routine sense is what really matters for most of these teachers. Thus, creative students who do not perform following this rigid routine will certainly be penalized.

The seventh characteristic chosen by the group of Egyptian teachers was 'well liked by peers'. The trouble is that creative people, when introducing new ideas to the group or society, often face criticism because of the conflict which such ideas generate in the existing system. Literature tells us that many creative people in the past were ostracized and sometimes punished because of the influence of their ideas upon society. Peer groups can hinder or even kill creative potential in creative individuals. Good teachers should be

capable of developing creative thinking in their students and of helping them to cope with the stress associated with divergence.

It is encouraging to note that the last three traits selected by the group of Egyptian teachers as desirable are in line with the traits of creative people as defined by experts on the creative personality. These traits are 'sincere', 'curious', and 'independent in thinking'. Creative individuals are always inclined to pursue the truth and to express their views without paying attention to what will happen to them as a result of this expression. They are never idle. They devote a lot of effort to exploring, seeing, understanding, and gaining more experience. They also believe in their ability to realize their potential.

Teachers have a very important role to play in connection with students' development in general and with the enhancing of creative thinking in particular.If we are to develop creativity in Egyptian students, teachers should be well trained and guided in this respect, so that they are prepared to put emphasis on the characteristics which are often indicative of creativity.

Chapter Nine

Conclusion

The present research was carried out in six preparatory schools, three for boys and three for girls, in El Fayoum City in Egypt. The sample comprised 230 children, 110 boys and 120 girls, who were in their second year of preparatory school. The main purpose of the research was to study the relationship between creativity and the locus of control (a personality construct) in these schoolchildren. The study was also concerned with the relationship between intelligence and both creativity and the locus of control, and with sex differences in creativity and locus of control. In addition, a sample of 100 preparatory school teachers answered the ideal pupil check-list so that the researcher could ascertain the kinds of behaviour which they would encourage or discourage in their pupils.

The importance of this research may be described in the following ways. Firstly: as our review of previous literature in the field has shown, the measurement of children's creativity appears not to have been very thoroughly handled. Previous studies have been based mainly upon creativity tests, which do not seem to be very effective as a criterion for measuring creative thinking. The reliability and validity of many of these tests has been questioned. Consequently, it was decided to use a new approach to measuring creativity. This consisted of assessing students' creativity by means of teachers' ratings and the students' scores on a creativity inventory, the Group Inventory For Finding Interests, GIFFI I. The Arabic and drawing teachers of the randomly selected second-year class in each of the six schools were asked to rate the students' creative performance in these subjects. The average of the two ratings was used as a criterion of creative performance for each student. Each student was also evaluated in terms of creative personality characteristics through his or her

answers on the creativity inventory GIFFI I. This inventory measures those personality and biographical characteristics which are related to creativity; such as self-confidence, independence, high energy levels, adventurousness, risk-taking, curiosity, humour, artistic interests, interest in ideas, attraction to complexity and mystery, and a background of creative hobbies and activities.

Secondly, this research includes a new construct in personality research, the Internal-External control, the relationship of which with students' creativity was examined. In theory, creativity and internal locus of control are associated. Thus, creative people are expected to be internally oriented because the source of control is themselves. By contrast, non-creative people rely upon outside sources in their perception of control. It was, therefore, to be expected that the present research would find empirical evidence for there being a relationship between the two factors in potentially creative children.

Thirdly, because of the importance of the role of teachers in helping students to develop their creative thinking, the study examined the concept of the ideal pupil as drawn from a group of Egyptian preparatory school teachers (n = 100) and their responses on the ideal pupil check-list. The aim was to examine whether their concept was congruent or incongruent with that of the experts on creativity. Values and attitudes held by teachers are important in connection with children's creativity. If teachers appreciate the personality traits of creative people, it may be expected that they will be more inclined to encourage them in their students. On the other hand, if teachers consider such traits undesirable, it is to be expected that they will be inclined to discourage them.

Finally, the concept of creativity was examined cross-culturally

in order to understand more about this phenomenon. This cross-cultural concept particularly has been developed and intensively investigated in Western cultures, in the UK and the USA in particular. Comparison of results across cultures may help in the education of gifted children. With this in mind, the scores of the Egyptian pupil on the creativity inventory GIFFI I were compared with similar findings for American and Australian children. In addition, the concept of the ideal pupil held by the group of Egyptian teachers was compared with that held by a group of American teachers and with that held by experts on the creative personality.

The following hypotheses, therefore, were under examination in the present research:

(1) That there would be significant relationships between creativity (as measured by the teachers' ratings and the scores on the creativity inventory GIFFI I) and internal locus of control (as measured by the Nowicki-Strickland I-E control test) in the present group of Egyptian preparatory school children.

(2) That there would be significant sex differences in creativity (as measured by the teachers' ratings and the scores on the creativity inventory GIFFI I) and locus of control (as measured by the Nowicki-Strickland I-E Control test) in the present group of Egyptian preparatory school children.

(3) That there would be significant relationships between creativity (as measured by the teachers' ratings and the scores on the creativity inventory GIFFI I) and intelligence (as measured by the Pictorial test) in the present group of Egyptian prepatory school children.

(4) That there would be a significant relationship between locus of control (as measured by the Nowicki-Strickland I-E Control test) and intelligence (as measured by the Pictorial test) in the present group of Egyptian preparatory school children.

(5) That the concept of the ideal pupil held by the present group of Egyptian prepatory school teachers would be inconsistent with that of experts on the creative personality in that it would stress qualities of conformity more than qualities of creativity.

The results regarding the first hypothesis showed a high negative correlation between the students' ratings of creativity and the locus of control scores ($r = -0.512$, significant at 0.001 level). This correlation indicated a significant relationship between the ratings of creativity and internal locus of control in this group ($n = 230$) of preparatory school children. When the scores of the whole sample of students on the creativity inventory were correlated with their scores on the locus of control test, none of the obtained correlations was significant. In the boys' sample ($n = 110$), however, there was a positive, low, but significant correlation only between 'Imagination', a subscale of the inventory, and the locus of control scores ($r = 0.141$, significant at 0.07 level). Contrary to the hypothesis, this correlation seems to suggest that imagination was related to external locus of control in the present group of boys. In the girls' sample ($n = 120$), too, there was a negative, low but significant correlation only between 'Confidence', a subscale of the inventory, and the locus of control scores ($r = -0.145$, significant at 0.05 level). This correlation seems to suggest that confidence was related to internal locus of control in this sample of girls. This finding is consistent

with the hypothesis. Finally, the analysis of variance which included the scores of the whole sample of children (r = 230) showed no significant difference between the internal control group (r = 115) and the external control group (n = 115) on the creativity inventory GIFFI I nor any significant interaction effects.

Thus, the first hypothesis was strongly supported when the ratings of creativity were used in the analysis. A high significant correlation between the pupils' ratings of creativity and internal control scores was found (r = -0.512, significant at 0.001 level). This hypothesis was only partially supported, however, when the scores on the creativity inventory were used. There was in the girls' sample (r = -0.145, significant at 0.05 level) a significant relationship only between 'Confidence', a subscale of the inventory, and internal control. Contrary to this hypothesis, the scores on 'Imagination', a subscale of the inventory, were correlated with the external control scores in the boys' sample (r = 0.141, significant at 0.07 level). Also, the analysis of variance, using the scores of the whole sample of students on the inventory, showed no significant differences between the internal control group (n = 115) and the external control group (n = 115), and showed no significant interaction effects.

On the basis of the present findings concerning the relationship between creativity and internal locus of control it can be argued that these two constructs were strongly related in the present sample of preparatory school children when the teachers' ratings of creativity were employed in the examination of this relationship. This relationship was not very clear when the students' scores on the creativity inventory were used as the creativity criterion. It was

only the scores on 'Confidence', a subscale of the GIFFI I inventory, which correlated with internal control scores in the girls' sample.

In general, the results would lend some support to the theory that there is a relationship between creativity and internal control in children. The teachers seemed to be more accurate in rating the students' creativity than the present inventory of creative characteristics. This inventory therefore cannot be used as a single criterion for assessing students' creativity. Along with the inventory, other criteria of creativity, such as assessment of creative performance, should be employed in order to assess adequately this factor in children.

Previous studies dealing with the relationship between creativity and the I-E control construct indicated a relationship between creativity and internal locus of control. The present study would therefore seem to contribute to the development of locus of control theory. In demonstrating greater creative performance and a heightened ability to manifest such creativity, the internal pupils performed better on creativity measures than their external counterparts. While the present study cannot determine the direction of causality, it would seem theoretically important for future research to investigate more fully the relationship between expectancy for control and creative performance with a wider range of dependent variables.

The scores obtained by the present group of Egyptian children on the creativity inventory GIFFI I were compared with the scores obtained by groups of American and Australian children in grade eight. It was found that the Egyptian group of children scored at about the same level as the American and Australian children. The average score of the Egyptian group was 188, with a standard deviation of 20.92,

while the averages in the American and Australian groups of children ranged from 171 to 184. The American and Australian groups were made up of children representative of different social and ethnic backgrounds. The finding for Egyptian children should, however, be regarded with caution since it was found in this study that the GIFFI I inventory was not effective in distinguishing between internally and externally oriented children. Hopefully, though, it may draw attention to the possibility of using the personality characteristic approach. The scores on the inventory should be combined with other creativity criteria, in comparing children's creativity in different cultures.

The second hypothesis was that these would be significant sex differences in this group of Egyptian children on: (a) on creativity measures (creativity ratings and the scores the inventory); (b) on the locus of control scores. The findings were as follows:

(a) The results showed that there was no significant difference between the boys (n = 110, mean creativity rating = 3.12, standard deviation = 1.13) and the girls (n = 120, mean creativity rating = 3.44, standard deviation = 1.12) in creativity ratings. Also, there was no significant difference between the boys (n = 110, mean = 189.5, standard deviation = 22.41) and the girls (n = 120, mean = 186.6, standard deviation = 19.45) on the total GIFFI I inventory scores. Thus, the part of the second hypothesis which had assumed differences between the boys and the girls was rejected. It seems that cultural change since the Egyptian revolution in 1952 has helped in increasing recognition of the equality of the sexes. This recognition has in turn contributed to the provision of equal opportunities for educating both

boys and girls in the country and to the encouraging of students' creative thinking. Egyptian people are interested in educating their children in order for them to have better job prospects. This phenomenon has, in fact, led to increasing social mobility and to an increase in the number of educated people, who are the most valuable resource of the country. Educated people and, indeed, creative individuals are essential for the achieving of progress and for solving the problems facing Egyptian society.

(b) The second part of the second hypothesis stated that there would be significant sex differences in the locus of control score. The results showed no significant difference between the boys ($n = 110$, mean $= 13.32$, standard deviation $= 3.67$) and the girls ($n = 120$, mean $= 13.88$, standard deviation $= 3.19$) on the I-E control test. Thus the boys did not differ regarding their scores from the girls on the locus of control test. This might be explained in terms of cultural change and of the climate in schools, which encourages both sexes to use their abilities, and this in turn might lead to a realization that being able to express their abilities helps creative children in the attaining of positive reinforcements. In other words, the atmosphere prevailing in schools may have helped in the building of causal relationships regarding behaviour and reinforcements in both sexes. For example, efforts in school work can lead to the reinforcement of good grades.

The testing of the second hypothesis, consistent with most previous results in this area, showed no significant sex differences regarding creativity and locus of control.

The third hypothesis dealt with the relationship between

creativity (as measured by the teachers' ratings and the scores on the GIFFI I inventory) and intelligence (as measured by the Pictorial test). The results showed no significant correlation between the creativity ratings and the intelligence scores in the present sample of children. There were also no significant correlations between the inventory scores and the intelligence scores in the whole sample of children. In the boys' sample, surprisingly, the scores for 'Imagination', a subscale of the creativity inventory, were negatively correlated with the intelligence scores ($r = 0.149$, significant at 0.05 level). In the girls' sample, the scores on the same subscale 'Imagination' were correlated with the intelligence scores ($r = 0.153$, significant at 0.05 level).

In general, the present results did not support the third hypothesis regarding the relationship between creativity and intelligence in this group of preparatory school children. Previous results in this area had indicated contradictory conclusions. The general picture provided by previous results indicates a moderate relationship between creativity and intelligence, particularly in the normal range of ability. But it should be stated that many factors, such as the range of ability being used, criteria of creativity and testing conditions, can affect the value of correlation obtained between these two constructs.

The fourth hypothesis was that there would be a significant correlation between the locus of control scores and intelligence scores in the present sample of children. The results showed a negligible correlation between these scores. Previous findings in this area had in general reached the same conclusion. Thus, this hypothesis was rejected, and this may lend some support to the validity of the

notion that the I-E control construct is independent of the variable of intelligence.

Finally, the fifth hypothesis anticipated that the responses of the group of Egyptian teachers on the ideal pupil check-list would be inconsistent with those of the experts on creativity. The present group of Egyptian teachers valued characteristics which were in general similar to those valued by the group of American teachers. Both groups, however, were divergent in their responses in comparison with the experts on creativity. The teachers stressed many attributes which are not helpful from the point of view of stimulating creative growth in children.

On the basis of the present findings one would expect that internally controlled children, being less concerned with external evaluation, would be more likely to perform better on creativity measures than externally controlled children, who would tend to perform according to more traditional modes of thinking that have been positively reinforced by powerful others in the past. The present results may indicate that the concepts of reinforcement expectancy and locus of control are critical variables in the identification and operationalization of those personality characteristics that are indicative of creative behaviour. The fact that children perceive reinforcement as being contingent upon their own behaviour may well increase the probability of their learning those creative modes of thinking that are characteristic of creative people. It would seem appropriate that other investigations should study further the relationship between locus of control and various measures of creativity before definite conclusions are drawn.

Sex differences in creativity and locus of control in Egyptian

children also need further examination before generalized conclusions can be reached. This may require the use, on the one hand, of tests of creative performance in different school subjects, along with valid ability measures, and, on the other, the use of newly designed measures of locus of control built in order to assess significant variables affecting perception of control in creative performance in particular (not, as is the case with these present measures, the general control factor). Such newly developed measures of locus of control may help in examining other important variables relating to creativity in children in the cognitive and affective domains.

Finally, because of the results obtained on the ideal pupil check-list, showing that the present group of Egyptian teachers were to a large extent not encouraging creative characteristics in students, it might be suggested that teacher training in Egypt should involve a course on creative thinking and its correlates in order to help preparatory school teachers to be more aware of this behaviour in children and more aware of ways of encouraging it. It is important too that such a course should be given to in-service teachers.

It must be affirmed that creativity should not be seen as something different and separate from personality. The creative person is creative in his whole approach to life. Good teachers can encourage creativity in children by helping them to develop towards maturity and self-actualization. Positive regard and empathetic understanding, as with other areas of personality, represent the most important contribution the teacher can make towards fostering creativity in children, and to these qualities we may add freedom from external evaluation, as discussed above. This means that, although the teacher is free, he should refrain from passing categorical judgements upon

the child's creative performance, since by its very nature divergent activity contains no immutable rules of correctness.

Finally, there is evidence that teachers sometimes find it harder to relate to children high in creativity than to other children. It has been suggested, for example, that the creative child's nonconformity and apparent self-sufficiency can make him less immediately attractive to teachers than are children with more conformist attributes. This means that teachers may sometimes have to take particular care not to allow the creative child's independent outlook to count against him. But this probably applies to all gifted children, whether their giftedness lies in very high creativity, very high intelligence, or both. Our education system must give sufficient attention to helping the gifted child live with and make good use of his gifts. The highly gifted child can feel as isolated from other children as can the child of correspondingly low ability. He can also feel as misunderstood and unappreciated. With his high level of curiosity and activity, and his boredom in the face of unchallenging work, he can be generally an uncomfortable member of the class. There is evidence that, perhaps because of their very feeling of separateness, gifted children play down their gifts in order to avoid antagonizing the teacher and in order to avoid unpopularity with the rest of the class. Such self-sufficiency may be potentially damaging to the personality. The cost to society in terms of lost potential needs no emphasizing. Nevertheless, appropriate teacher training can help in the creation in schools of an ethos which can enhance different gifts in children, creativity in particular.

APPENDICES

APPENDIX I

Group Inventory For Finding Interests© (GIFFI)

Sylvia B. Rimm and Gary A. Davis

Level 1 — Grades 6-9

Name _____ Grade _____ M — F
LAST FIRST MIDDLE

School _____ Date of Test _____

City _____

INSTRUCTIONS TO STUDENTS:

Read each sentence and mark how much you agree with it. Use a pencil and fill in the appropriate circle completely. There are no right or wrong answers. We only want to know how you think and how you feel about things.

Sample Questions:

	NO	TO A SMALL EXTENT	AVERAGE	MORE THAN AVERAGE	DEFINITELY
1. I like to eat ice cream.	○	○	○	○	●
2. I would like to be a school principal.	○	●	○	○	○

	NO	TO A SMALL EXTENT	AVERAGE	MORE THAN AVERAGE	DEFINITELY
I would like to be a pilot and fly airplanes.	○	○	○	○	○
I like to take walks alone.	○	○	○	○	○
I have a good sense of humor.	○	○	○	○	○
I like to make up my own songs.	○	○	○	○	○
When I get older, I would like a job with a lot of traveling.	○	○	○	○	○
My mom or dad like to do things with me.	○	○	○	○	○
I ask a lot of questions.	○	○	○	○	○
I like to draw or paint pictures.	○	○	○	○	○
I am very full of energy.	○	○	○	○	○
I like to think of new and better ways to do things.	○	○	○	○	○
Making up stories is a waste of time.	○	○	○	○	○
I have had lots of hobbies.	○	○	○	○	○
I like to hear about life in other countries.	○	○	○	○	○
It's all right to sometimes change the rules of a game.	○	○	○	○	○
I would like to live and work in a foreign country like Spain or Germany.	○	○	○	○	○
I often make things or build things.	○	○	○	○	○
I have some really good ideas.	○	○	○	○	○
I like things that are hard to do.	○	○	○	○	○
I am interested in a lot of different things.	○	○	○	○	○
When I get older, I would like to try sky-diving (parachute jumping).	○	○	○	○	○
A picture of the sun should always be colored yellow.	○	○	○	○	○

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	NO	TO A SMALL EXTENT	AVERAGE	MORE THAN AVERAGE	DEFINITELY
22. I like to take things apart to see how they work.	○	○	○	○	○
23. I like to write stories.	○	○	○	○	○
24. I like to invent things.	○	○	○	○	○
25. Easy puzzles are the most fun.	○	○	○	○	○
26. Sometimes my mom or dad and I make things together.	○	○	○	○	○
27. I would like to know more about things like flying saucers, witchcraft and ghosts.	○	○	○	○	○
28. School is pretty easy for me.	○	○	○	○	○
29. I like to learn about strange animals.	○	○	○	○	○
30. I like to try new activities and projects.	○	○	○	○	○
31. I like new ideas.	○	○	○	○	○
32. It's hard to find things to do when I'm alone.	○	○	○	○	○
33. I would like to be an actor or actress in dramatic plays.	○	○	○	○	○
34. I often think about what is right and what is wrong.	○	○	○	○	○
35. I like to attend concerts.	○	○	○	○	○
36. I like stories of long ago.	○	○	○	○	○
37. I read a lot of books.	○	○	○	○	○
38. I make up games, stories, poems, or art work more than other students do.	○	○	○	○	○
39. When something I want to do gets hard, I give up and try something else.	○	○	○	○	○
40. I always like to play with friends, but never alone.	○	○	○	○	○
41. I have taken art, dancing or music lessons outside of school because I wanted to.	○	○	○	○	○

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	NO	TO A SMALL EXTENT	AVERAGE	MORE THAN AVERAGE	DEFINITELY
42. I have had collections of unusual objects.	○	○	○	○	○
43. I like to do handicraft projects.	○	○	○	○	○
44. I often wonder what makes me dream.	○	○	○	○	○
45. Playing make-believe games seems babyish.	○	○	○	○	○
46. I would go to a new place only if I knew someone else who was going there.	○	○	○	○	○
47. I own painting and drawing supplies.	○	○	○	○	○
48. I try to stay away from things that are very difficult.	○	○	○	○	○
49. I have thought about a job as an artist or a writer.	○	○	○	○	○
50. I like to do my own science experiments.	○	○	○	○	○
51. I like to read books about the future.	○	○	○	○	○
52. I would like to try a different school for a while.	○	○	○	○	○
53. I used to have (or still have) a pretend playmate.	○	○	○	○	○
54. My parents read more books than most parents.	○	○	○	○	○
55. I can work on a hobby for a long time and not get bored.	○	○	○	○	○
56. I am a lot like most of my friends.	○	○	○	○	○
57. My mother or father likes to visit art galleries and museums.	○	○	○	○	○
58. I have performed music with school or community groups.	○	○	○	○	○
59. It's important to me to participate in team sports.	○	○	○	○	○
60. I think using your imagination is important.	○	○	○	○	○

APPENDIX II: THE IDEAL PUPIL CHECK-LIST

Name:

School:

Date:

To guide a child to the highest fulfilment of his potentialities, what characteristics or behaviour should be encouraged and discouraged? Indicate your ideas, using the list below:

(1) Check (✓) each characteristic or behaviour that you think should be encouraged;

(2) Double-check (✓✓) each characteristic or behaviour that you think should be especially encouraged; and

(3) Strike through each characteristic or behaviour that you think should be discouraged.

1. Adventurous
2. Affectionate
3. Altruistic
4. Always asking questions
5. Attemps difficult tasks
6. A self-starter
7. A good guesser
8. Bashful
9. Becomes preoccupied with tasks
10. Considerate of others
11. Critical of others
12. Courageous in convictions

13. Courteous
14. Curious
15. Competitive
16. Desires to excel
17. Determined
18. Domineering
19. Disturbs class organization and procedures
20. Does work on time
21. Emotional
22. Emotionally sensitive
23. Energetic
24. Fault-finding
25. Haughty and self-satisfied
26. Healthy
27. Independent in judgment
28. Independent in thinking
29. Intuitive
30. Industrious
31. Likes to work alone
32. Never bored
33. Nonconformist
34. Negativistic
35. Obedient
36. Popular, well-liked by peers
37. Persistent
38. Prefers complex tasks
39. Physically strong
40. Quiet

41. Receptive to ideas of others
42. Regresses occasionally
43. Reserved
44. Remembers well
45. Self-confident
46. Self-assertive
47. Self-sufficient
48. Sense of humour
49. Sense of beauty
50. Sincere
51. Spirited in disagreement
52. Strives for distant goals
53. Stubborn
54. Sophisticated
55. Timid
56. Thorough
57. Talkative
58. Unwilling to accept things on mere say-so
59. Visionary
60. Versatile, well-rounded
61. Willing to take risks
62. Willing to accept judgements of authorities

APPENDIX III : TEACHERS' RATING SCALE OF CREATIVITY

It would be a help if you could give a rating of creativity or imagination for each of the pupils listed, using the following scale:

A - Highly creative

B - Above average creativity

C - Average creativity

D - Below average creativity

E - Not creative

APPENDIX IV : THE NOWICKI-STRICKLAND LOCUS OF CONTROL SCALE

Name:

Age:

Sex:

Instructions

1. This scale is used for measuring how people think of particular things.

2. The scale consists of forty questions; against each one there are two pairs of parentheses under the words 'yes' and 'no'.

3. Read each question, then put the mark (X) between the parentheses under the word which represents your answer.

4. There is no right or wrong answer. The answer will be right if it expresses your actual opinion.

5. There is no specific time for responding to the test but do not think for a long time about the answer - write the first answer which comes to your mind after reading the question.

Example:	Yes	No
Can your school football team win the cup?	( )	( )
If you think that the answer is 'yes' put the mark like this	(X)	( )
If you think that the answer is 'no' put the mark like this	( )	(X)

DO NOT TURN THE PAGE UNTIL ALLOWED

		Yes	No
1.	Do you believe that most problems will solve themselves if you just don't fool with them?	( )	( )
2.	Do you believe that you can stop yourself from catching a cold?	( )	( )
3.	Are some children just born lucky?	( )	( )
4.	Most of the time do you feel that getting good grades means a great deal to you?	( )	( )
5.	Are you often blamed for things that just aren't your fault?	( )	( )
6.	Do you believe that if somebody studies hard enough he or she can pass any subject?	( )	( )
7.	Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?	( )	( )
8.	Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do?	( )	( )
9.	Do you feel that most of the time parents listen to what their children have to say?	( )	( )
10.	Do you believe that wishing can make good things happen?	( )	( )
11.	When you get punished does it usually seem that it's for no good reason at all?	( )	( )
12.	Most of the time do you find it hard to change a friend's opinion?	( )	( )
13.	Do you think that cheering more than luck helps a team win?	( )	( )
14.	Do you feel that it's nearly impossible to change your parents' mind about anything?	( )	( )
15.	Do you believe that your parents should allow you to make most of your own decisions?	( )	( )
16.	Do you feel that when you do something wrong there's little you can do to make it right?	( )	( )
17.	Do you believe that most children are just born good at sports?	( )	( )

		Yes	No
18.	Are most of the other children your age stronger than you are?	( )	( )
19.	Do you feel that one of the best ways to handle most problems is just not to think about them?	( )	( )
20.	Do you feel that you have a lot of choice in deciding who your friends are?	( )	( )
21.	If you find a blue bead do you believe that it might bring you good luck?	( )	( )
22.	Do you often feel that whether you do your homework has much to do with what kind of grades you get?	( )	( )
23.	Do you feel that when a child your age decides to hit you, there's little you can do to stop him or her?	( )	( )
24.	Have you ever had a good luck charm?	( )	( )
25.	Do you believe that whether or not people like you depends on how you act?	( )	( )
26.	Will your parents usually help you if you ask them to?	( )	( )
27.	Have you felt that when people were mean to you it was usually for no reason at all?	( )	( )
28.	Most of the time, do you feel that you can change what might happen tomorrow by what you do today?	( )	( )
29.	Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?	( )	( )
30.	Do you think that children can get their own way if they just keep trying?	( )	( )
31.	Most of the time do you find it useless to try to get your own way at home?	( )	( )
32.	Do you feel that when good things happen they happen because of hard work?	( )	( )
33.	Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?	( )	( )
34.	Do you feel that it's easy to get friends to do what you want them to?	( )	( )

		Yes	No
35.	Do you usually feel that you have little to say about what you get to eat at home?	( )	( )
36.	Do you feel that when someone doesn't like you there's little you can do about it?	( )	( )
37.	Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?	( )	( )
38.	Are you the kind of person who believes that planning ahead makes things turn our better?	( )	( )
39.	Most of the time, do you feel that you have little to say about what your family decides to do?	( )	( )
40.	Do you think that it's better to be smart than to be lucky.	( )	( )

APPENDIX V : PICTORIAL INTELLIGENCE TEST

(Translation follows)

الدكتور احمد زكي صالح

اختبار الذكاء المصور

الاسم _____

السن _____

تاريخ اليوم _____

الدرجة	المقابل

توقيع المصحح

1

تعليمات

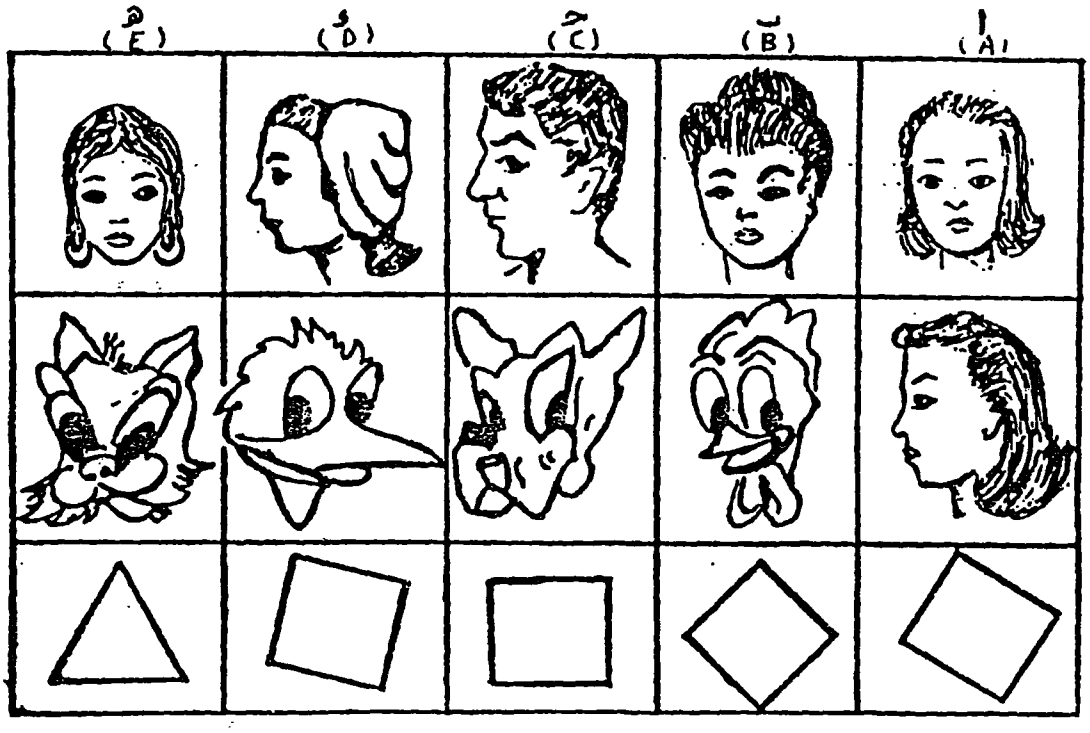
يهدف هذا الاختبار إلى قياس القدرة على إدراك التشابه والاختلاف بين الموضوعات والأشياء .

ويوجد فى هذا الاختبار مجموعات من الصور . كل مجموعة تتكون من خمس صور أو خمسة أشكال ، أربعة منها متفقة أو متشابهة فى صفة واحدة أو أكثر ، وشكل واحد فقط هو المختلف عن الباقين .

والمطلوب منك فى هذا الاختبار أن تبحث عن هذا الشكل المختلف بين أفراد المجموعة الواحدة وتضع عليه علامة (×) .

والآن فلنتدرب على بعض الأمثلة حتى نتأكد من فهمنا لهذا النوع من المشاكل :

ابحث عن الشكل المخالف فى كل مجموعة من المجموعات الآتية وضع عليه علامة (×) .



ما هو الشكل المخالف فى المجموعة رقم (١) ؟

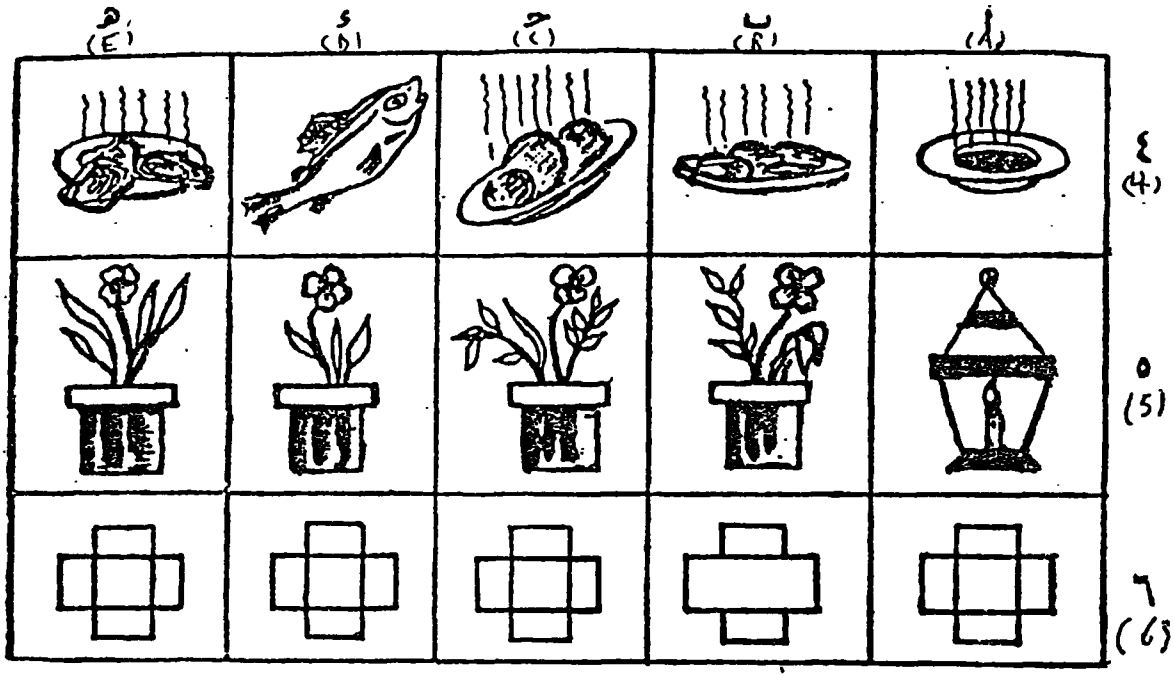
لاحظ أن كل الصور تعبر عن « بنت » أو « سيدة » ما عدا الصورة (حـ) فهى تعبر عن رجل ، ولذلك يجب أن نضع عليها علامة (×) .

أما فى المثال رقم (٢) فإن الشكل المخالف هو (١) ، لماذا ؟

وفى المثال رقم (٣) فإن الشكل المخالف هو (هـ) ، لماذا ؟

2

والآن أجب عن الأسئلة التالية بنفسك وحينما تنتهى منها ضع القلم .



الإجابة الصحيحة فى المثال رقم (٤) هى (و) لماذا ؟

والإجابة الصحيحة فى المثال رقم (٥) هى (ا) لماذا ؟

والإجابة الصحيحة فى المثال رقم (٦) هى (ب) لماذا ؟

والآن قد فهمت هذا النوع من المشاكل . المطلوب منك الآن أن تعمل بسرعة ودقة ولا ترتكب أخطاء ، لا تضيع وقتاً طويلا فى سؤال واحد . ستعطى عشر دقائق فقط للإجابة عن الأسئلة فى هذه الكراسة ، وهى ستون سؤالا .

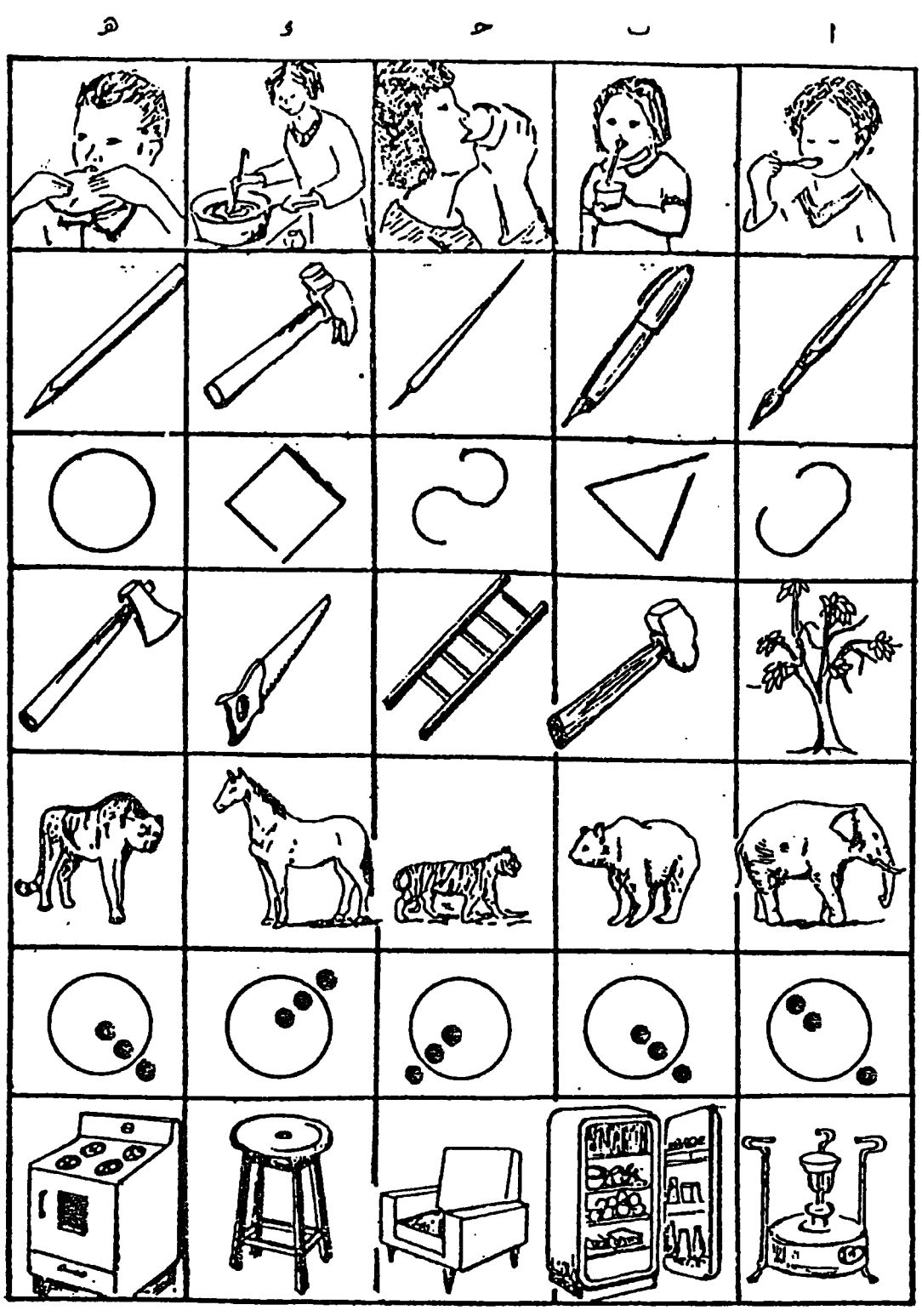
ليس من المفروض أن تحل كل الأسئلة . لا تضيع وقتاً طويلا فى سؤال واحد .

حالما تعطى تعليمات بالإجابة ابدأ واستمر فى الإجابة عن أسئلة الاختبار حتى يطلب منك أن تضع القلم .

لا تقلب هذه الصفحة قبل أن يؤذن لك .

ولا تسأل أسئلة كيلا تضيع وقتاً .

3



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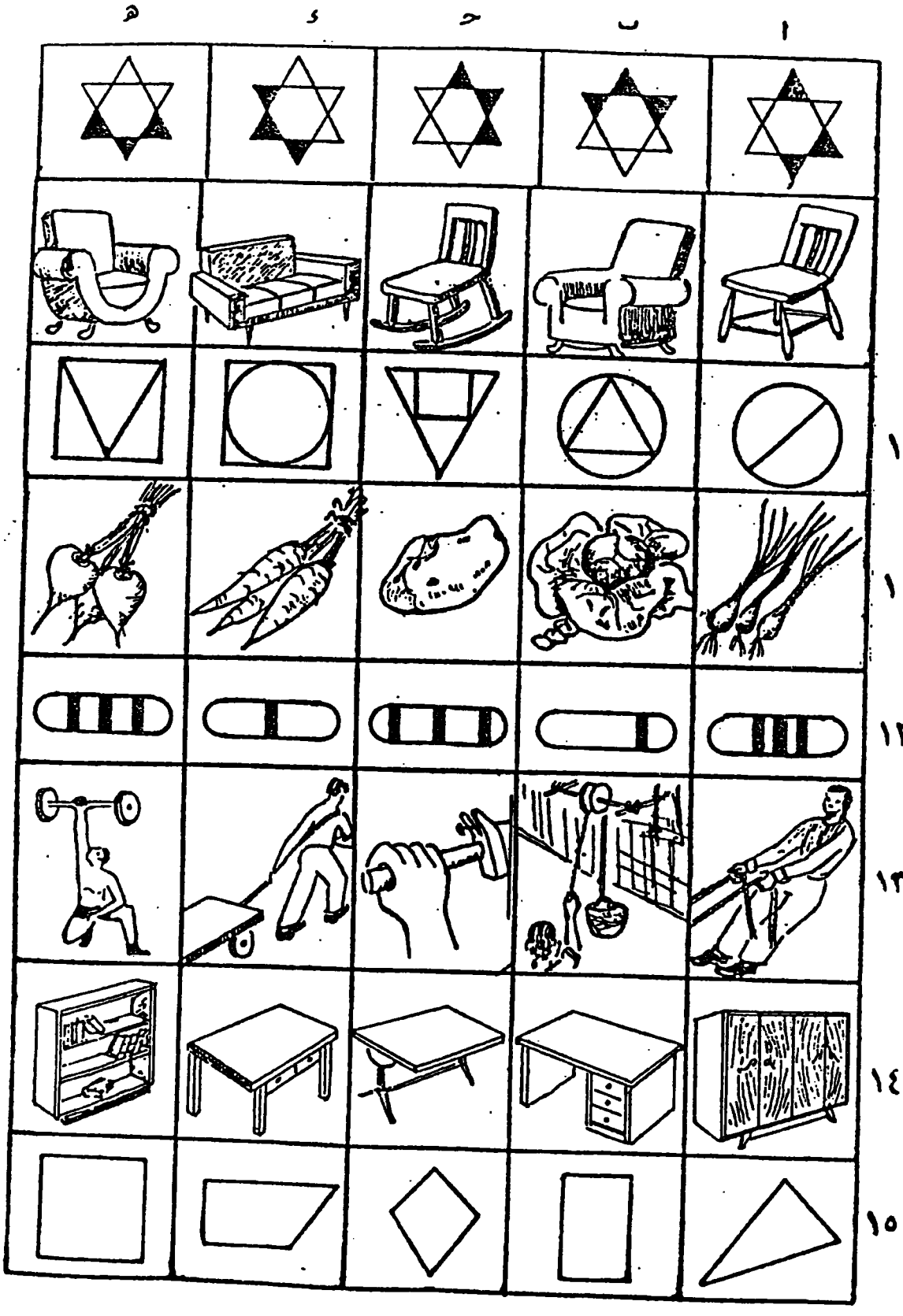

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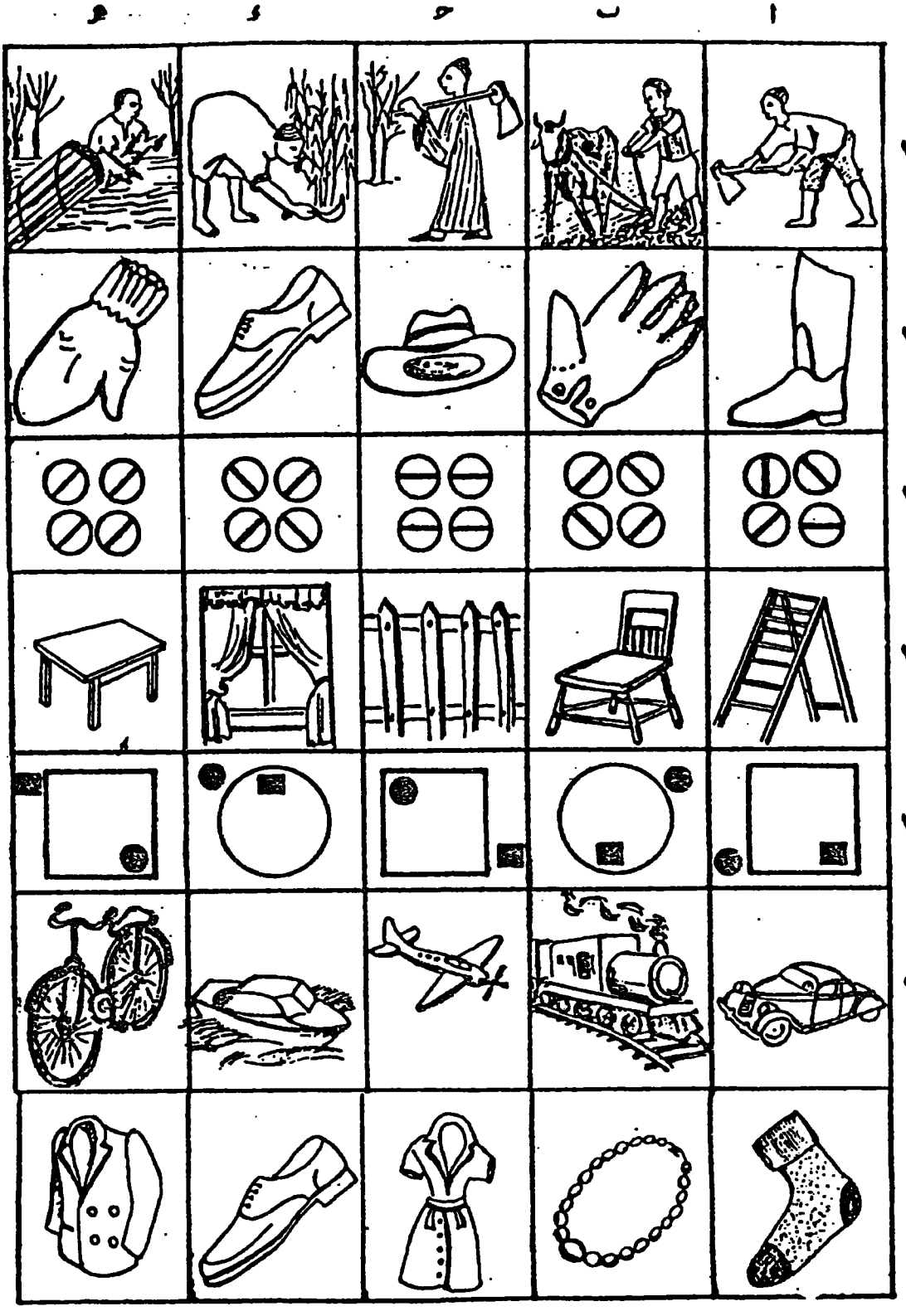

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	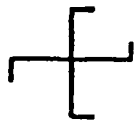		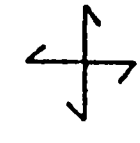	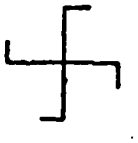	٢٣
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			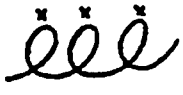		٢٦
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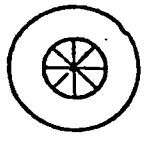
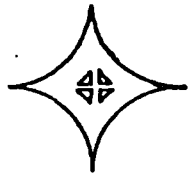
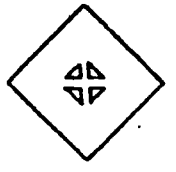
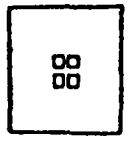
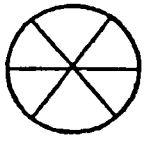
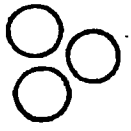
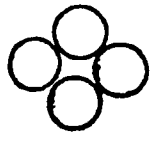
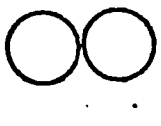
					٢٩
					٣٠

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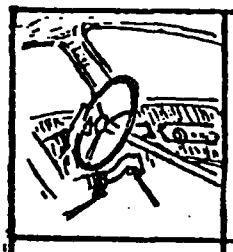
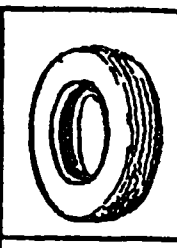
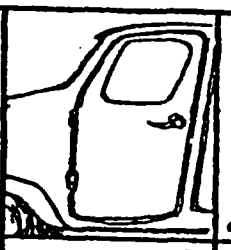
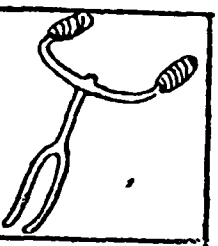
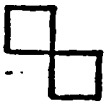
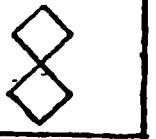
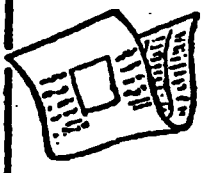
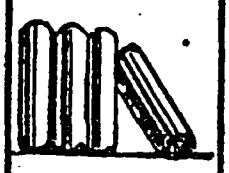
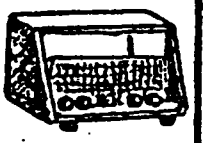
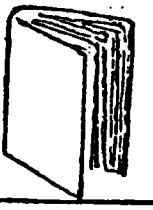
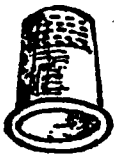
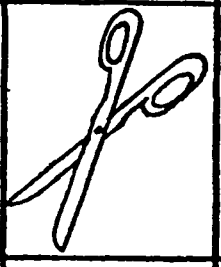
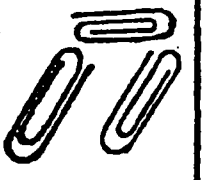
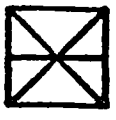
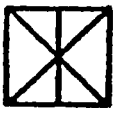
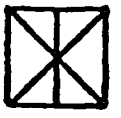
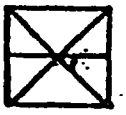
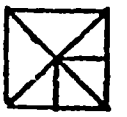
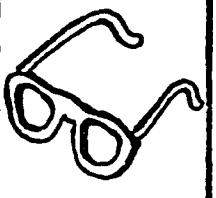
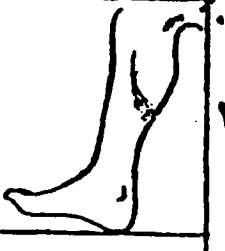
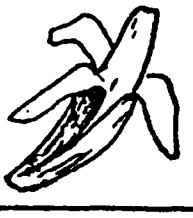
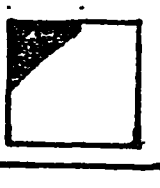
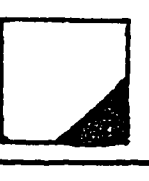
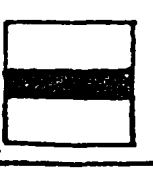
					٣١
					٣٢
					٣٣
					٣٤
					٣٥
					٣٦
					٣٧
					٣٨

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	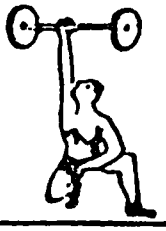	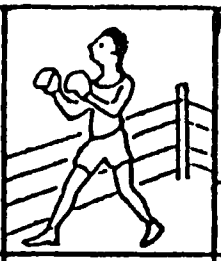			٣٩
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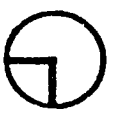
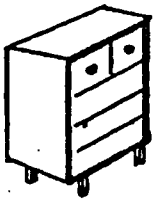
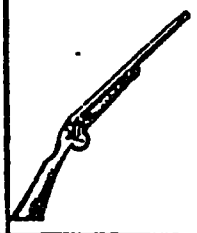
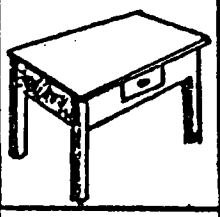
					٤١
					٤٢
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		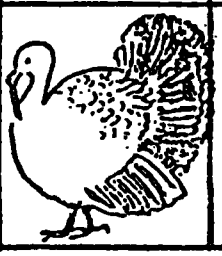			٤٥

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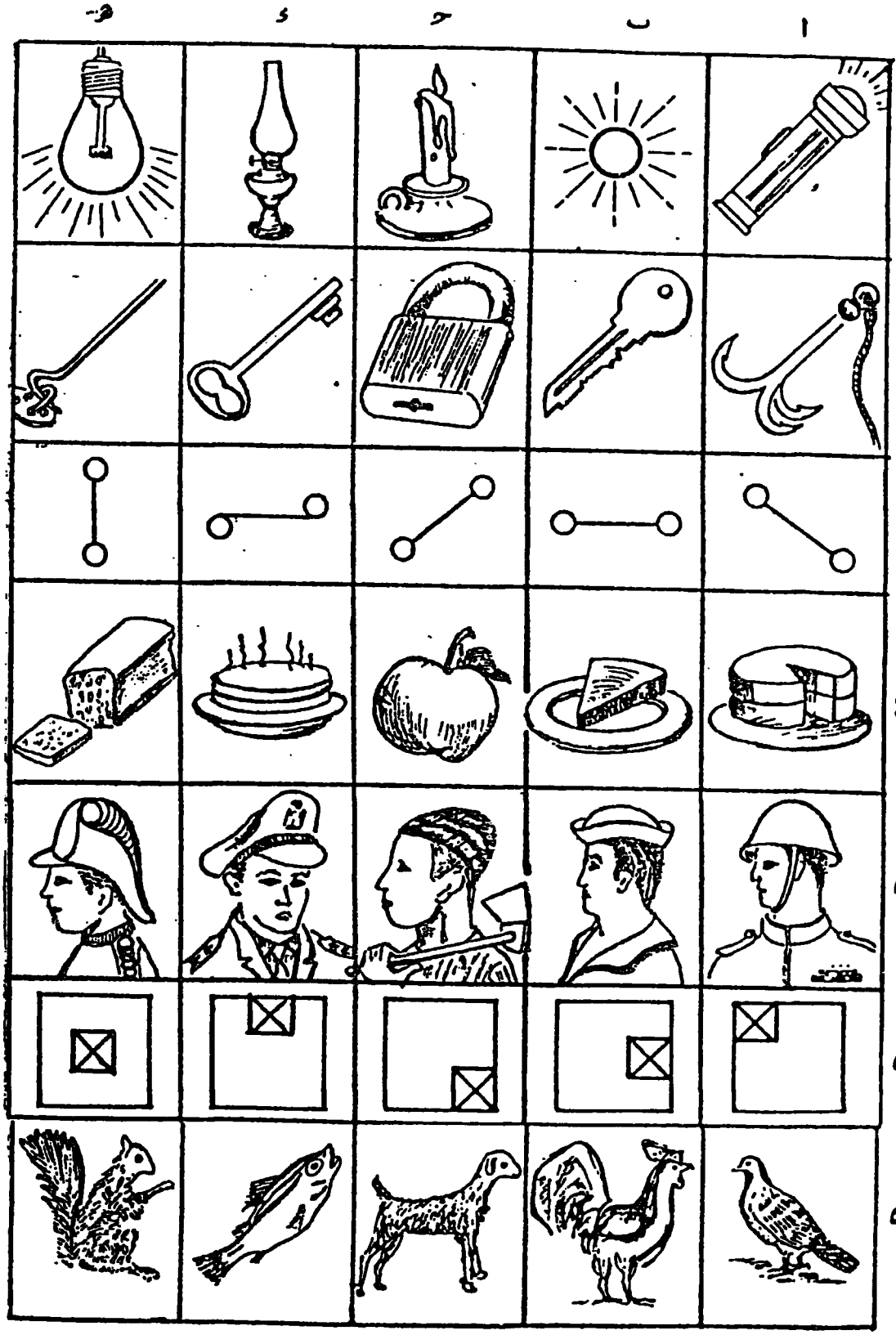

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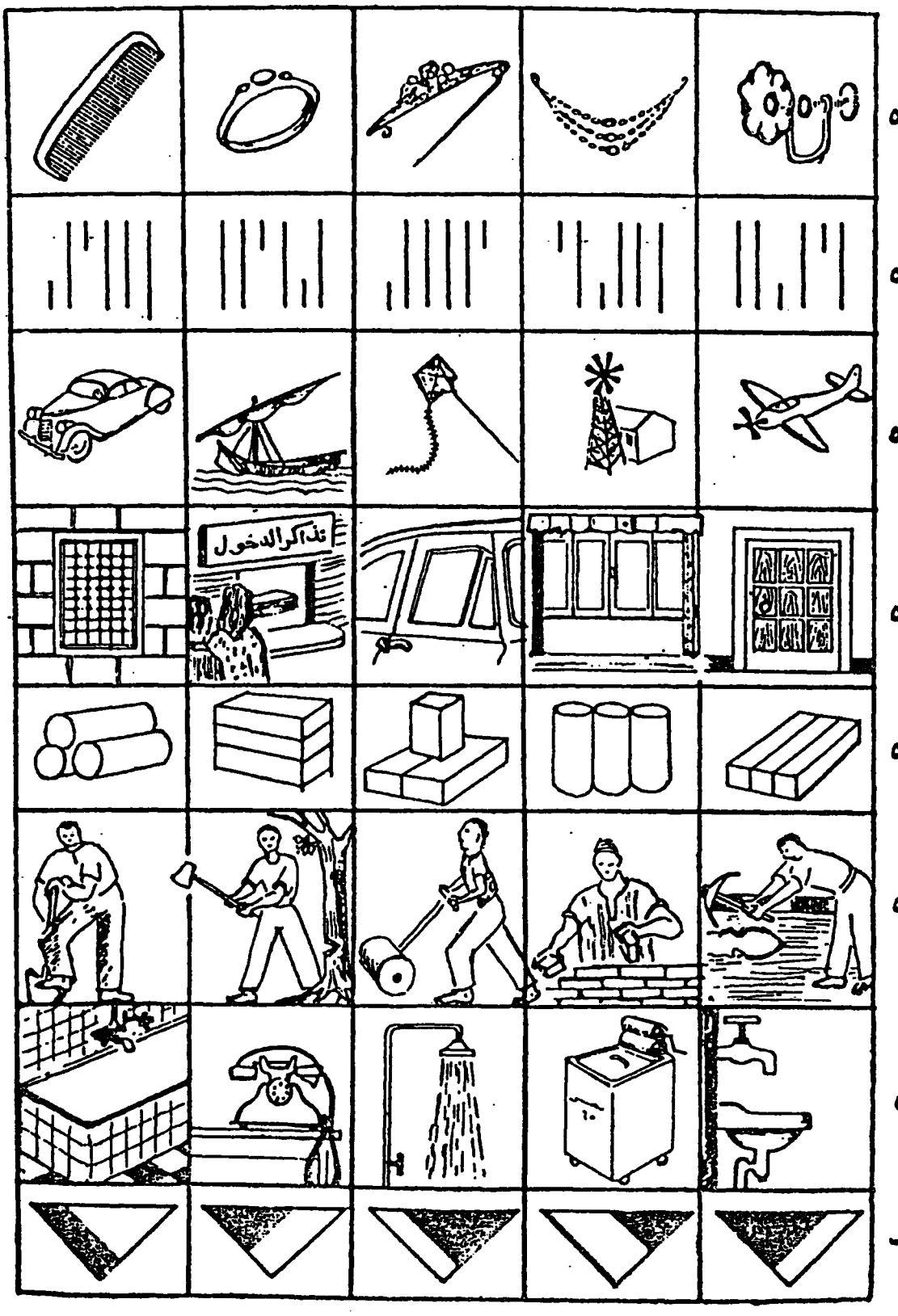

APPENDIX V (continued)

TRANSLATION OF ARABIC TEXT

The test was standardized in Egyptian schools by Dr A. Z. Saleh

Pictorial Intelligence Test

Name: _____

Age: _____

Date: _____

Score Equivalent

Signature of scorer:

Instructions

This test aims at measuring the ability to perceive similarities and differences between subject and things.

The test consists of groups of pictures. Each group contains five pictures. Four of them are concordant in one or more attribute; one picture only is different from the others.

In each group you are required to search for the different picture and put the mark (X) on it.

We shall try to answer some examples to make sure that we understand this type of problem: Look for the different picture in each of the following and put (X) on it.

What is the different picture in group (1)? Notice that all pictures represent either a girl or a lady except picture (C), which is of a man. Therefore you should put (X) on this picture.

In example (2) the different picture is (A). Why?
In example (3) the different picture is (E). Why?

Now answer the following questions. After you finish put your pen down.

In example (4) the answer is (D). Why?

In example (5) the answer is (A). Why?

In example (6) the answer is (B). Why?

Now you have understood this type of problem. You are required to work quickly and accurately without mistakes but do not spend much time on one question. You will be given TEN MINUTES ONLY to answer the questions in this booklet, which contains sixty questions.

You are not expected to answer all questions. Do not spend much time on any one question.

When you are told to answer the test, start and go on until you are asked to put your pen down.

DO NOT TURN THIS PAGE UNTIL YOU ARE ALLOWED.

To save time, try not to ask questions during this test.

APPENDIX VI

MEANS AND STANDARD DEVIATIONS OF THE STUDENTS' SAMPLE (N=230) ON THE GIFFI I TOTAL SCORE, THE NOWICKI-STRICKLAND TEST, THE PICTORIAL INTELLIGENCE TEST, AND THE RATINGS OF CREATIVITY

Test	Mean	Standard Deviation
The GIFFI I (Total Score)	188.08	20.79
The Nowicki-Strickland	13.60	3.42
The Pictorial Intelligence	104.96	9.40
Ratings of Creativity	3.29	1.07

APPENDIX VI (continued)

MEANS AND STANDARD DEVIATIONS OF THE STUDENTS' SAMPLE (N = 230) ON THE GIFFI I INVENTORY: SUBSCALES AND TOTAL SCORE

	Mean	Standard Deviation
1 - Creative Writing and Arts	28.08	5.15
2 - Challenge and Inventiveness	47.69	8.37
2 - Confidence	29.44	4.16
4 - Imagination	31.08	5.12
5 - Many Interests	51.67	9.08
6 - Total Score	187.97	20.92

APPENDIX VII

THE STUDENTS' SCORES ON THE TESTS OF INTELLIGENCE, THE CREATIVITY INVENTORY, THE TEACHERS' RATINGS OF CREATIVITY AND THE LOCUS OF CONTRO

	Intelligence Scores	The Creativity Inventory GIFFI I					Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
1	107	34	63	29	31	63	220	3	15
2	107	26	63	34	25	44	192	3	11
3	111	29	65	36	27	65	222	2	10
4	110	29	41	26	30	51	177	4	15
5	114	19	52	32	32	53	188	3	11
6	102	21	50	30	32	54	187	4	13
7	100	33	51	28	43	65	220	5	14
8	95	37	58	27	25	55	202	4	16
9	114	37	56	28	36	68	225	1	7
10	105	35	63	29	41	74	242	4	16
11	111	19	35	33	20	37	144	1	8
12	103	29	63	33	41	64	230	5	14
13	115	33	51	26	35	56	201	2	8
14	104	25	64	34	32	52	207	5	18
15	103	24	46	23	32	45	170	4	19
16	112	33	51	30	33	66	213	3	12
17	96	29	64	25	29	60	207	3	12

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
18	93	24	42	35	36	48	185	1	7
19	115	33	61	29	35	71	229	1	7
20	100	27	53	25	29	52	186	3	14
21	105	18	44	27	26	44	159	1	6
22	102	32	48	27	29	46	182	4	17
23	130	31	59	31	30	58	209	2	8
24	103	29	48	34	26	58	195	4	14
25	110	27	59	27	31	59	203	3	12
26	136	29	53	30	23	55	190	2	22
27	109	24	54	28	20	55	181	4	13
28	104	24	33	22	36	51	166	4	15
29	105	35	57	32	29	72	225	3	12
30	120	23	40	27	32	50	172	1	20
31	102	26	36	33	15	38	148	3	11
32	96	24	49	25	33	50	181	3	11
33	105	33	57	26	34	56	206	3	16

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
34	120	30	53	27	37	52	199	4	15
35	98	17	36	28	25	43	149	1	7
36	115	28	61	30	32	69	220	4	14
37	111	29	56	33	26	48	192	5	16
38	127	34	63	28	30	70	225	4	13
39	120	24	62	28	23	55	192	5	14
40	102	23	63	24	27	43	180	5	14
41	100	31	50	26	32	55	194	4	20
42	95	27	58	29	35	58	207	4	20
43	110	20	39	30	26	45	160	3	14
44	94	30	53	28	29	58	198	3	18
45	122	30	60	35	27	53	205	3	13
46	90	25	64	32	29	74	224	2	9
47	120	21	48	29	25	46	169	2	24
48	105	23	66	30	38	59	216	3	18
49	100	27	45	25	31	54	182	4	13

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
50	102	29	50	24	25	56	184	3	11
51	95	32	54	34	40	65	225	3	14
52	100	31	39	32	29	51	182	3	12
53	105	36	38	29	34	53	190	3	11
54	102	28	36	27	26	47	164	3	11
55	95	22	42	31	28	29	152	3	12
56	109	35	51	29	27	64	206	4	17
57	98	24	49	23	35	51	182	4	16
58	95	29	54	25	37	49	194	4	17
59	120	32	50	27	29	50	188	5	14
60	102	32	54	29	39	59	213	5	15
61	98	19	58	30	30	45	182	1	9
62	94	35	44	26	36	53	194	2	21
63	111	17	46	24	24	39	150	3	11
64	105	25	40	27	39	46	177	1	9
65	106	22	51	32	23	41	169	4	16
66	120	29	53	27	34	60	203	2	21
67	95	29	65	31	38	62	225	3	11
68	123	41	64	39	28	65	237	4	16
69	115	35	51	29	37	67	225	4	16
70	100	29	48	32	35	49	193	4	16
71	95	31	42	27	24	46	170	5	7
72	105	29	51	29	36	48	193	1	15
73	109	27	54	26	28	44	179	4	12

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
74	111	26	57	28	35	60	206	3	10
75	104	27	52	29	29	58	195	1	14
76	102	23	48	26	39	51	187	4	18
77	115	28	56	32	27	47	190	4	12
78	90	30	55	28	34	49	196	3	12
79	105	27	45	26	33	48	179	3	19
80	110	32	38	26	27	40	163	3	15
81	130	22	45	19	32	43	161	5	11
82	115	35	46	26	31	41	179	3	12
83	110	26	52	22	34	34	168	3	13
84	100	27	48	35	36	43	189	4	13
85	102	22	49	29	29	35	164	4	17
86	106	31	39	37	23	40	170	4	10
87	100	31	42	31	35	50	189	4	18
88	92	19	51	28	28	51	177	2	11
89	90	34	44	25	25	52	180	3	7
90	105	29	58	33	31	51	202	3	7
91	110	32	64	24	35	57	212	1	13
92	120	36	48	28	33	60	205	2	11
93	111	14	44	29	33	45	165	3	18
94	110	25	46	26	33	50	180	4	16
95	95	28	47	27	33	53	188	3	11
96	104	34	55	25	35	60	209	2	9

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
97	100	29	39	27	35	48	178	4	13
98	110	23	35	27	28	45	158	2	11
99	112	26	56	28	32	53	195	1	9
100	95	39	46	28	35	62	210	3	12
101	100	28	49	26	32	48	183	4	16
102	98	20	35	23	30	45	153	2	10
103	115	27	43	32	33	42	177	3	11
104	120	29	35	22	25	33	144	3	11
105	95	26	53	24	34	28	165	4	14
106	120	20	30	27	30	34	141	4	14
107	105	20	44	29	25	44	162	5	15
108	125	29	49	29	36	51	194	2	11
109	95	30	64	31	34	48	207	3	12
110	102	23	48	27	34	46	178	3	13
111	104	20	28	29	26	32	135	4	16
112	96	35	38	38	26	54	191	3	13
113	90	27	31	31	34	55	178	3	13
114	92	27	48	23	31	48	177	2	20
115	101	22	37	31	32	64	186	5	15
116	95	34	51	23	30	56	194	5	14
117	106	31	41	27	36	57	192	4	16
118	95	23	34	22	24	20	123	4	13
119	114	35	47	31	32	56	201	4	14
120	94	29	43	24	27	55	178	4	19

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
121	102	22	44	31	22	44	163	3	11
122	100	23	49	28	28	46	174	5	14
123	92	32	51	29	32	63	207	5	15
124	104	24	48	39	38	53	202	3	13
125	97	35	40	33	29	54	191	4	14
126	95	25	51	38	36	58	208	4	15
127	100	33	56	39	28	71	227	4	14
128	120	26	40	27	27	50	170	4	19
129	105	35	44	35	35	53	202	2	20
130	110	30	45	36	28	52	191	1	9
131	107	17	41	34	30	45	167	3	14
132	102	34	42	29	25	61	191	3	13
133	110	34	39	28	29	50	180	1	10
134	109	32	47	26	36	54	195	1	26
135	94	21	47	27	26	41	162	4	16
136	105	27	43	25	27	45	167	4	14
137	102	33	44	27	34	56	194	4	14
138	115	22	45	30	37	42	176	3	13
139	114	34	44	32	34	52	196	3	13
140	98	21	30	25	31	53	160	3	11
141	102	24	48	35	24	55	186	3	13
142	104	31	41	29	34	67	202	3	11
143	93	24	54	32	29	58	197	3	12
144	115	32	49	38	39	62	220	3	11

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
145	105	31	50	29	26	59	195	2	21
146	94	27	45	31	23	48	174	3	13
147	105	31	48	33	25	66	203	5	16
148	120	31	38	31	25	36	161	4	14
149	100	34	43	26	27	44	174	5	15
150	102	28	52	28	38	45	191	3	11
151	135	30	54	27	35	68	214	1	9
152	95	28	50	37	37	40	192	3	12
153	96	28	40	29	32	47	176	3	11
154	100	30	45	32	30	49	186	4	18
155	109	21	37	29	34	47	168	1	9
156	111	23	46	30	28	48	175	5	16
157	110	21	56	32	46	63	218	4	14
158	100	19	57	32	37	53	198	3	12
159	104	26	45	27	29	49	176	3	12
160	95	23	51	23	33	41	171	5	17
161	120	35	55	39	27	53	209	1	9
162	105	25	38	36	33	45	177	3	19
163	114	26	44	24	32	52	178	2	10
164	110	21	57	33	35	50	196	3	11
165	112	38	50	28	30	57	203	1	9
166	103	30	54	29	36	50	199	3	11
167	110	25	57	31	32	60	205	4	17
168	103	16	35	26	29	39	145	4	18

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
169	107	34	45	31	32	51	193	4	18
170	100	33	48	31	40	54	206	3	11
171	105	30	41	34	42	56	203	3	11
172	107	31	50	27	38	54	200	5	16
173	90	27	47	34	24	46	178	4	13
174	105	19	33	38	26	40	156	4	15
175	102	27	42	25	26	38	158	5	14
176	120	24	35	27	25	50	161	4	13
177	95	33	39	30	31	54	187	2	10
178	90	28	37	35	25	49	174	2	10
179	103	41	34	34	32	52	193	5	14
180	105	37	58	29	41	52	217	4	15
181	92	29	62	38	42	55	226	3	11
182	100	25	36	34	44	52	191	2	10
183	110	33	39	33	35	35	175	5	15
184	104	24	36	32	35	46	173	5	15
185	100	32	48	30	27	58	187	3	11
186	108	37	43	29	29	62	200	1	8
187	111	29	60	32	32	48	201	1	8
188	96	26	36	33	32	36	163	4	16
189	110	29	48	37	29	52	195	3	11
190	94	27	38	30	22	47	164	2	9
191	105	30	67	26	24	64	211	4	13
192	104	29	54	28	25	43	179	4	15

	Intelligence Scores	The Creativity Inventory GIFFI I						Teachers' Ratings of Creativity	Locus o Control Score
		Creative Writing and Arts	Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score		
193	144	29	42	33	40	48	192	4	15
194	111	23	40	36	22	64	185	4	16
195	96	25	49	32	33	44	183	4	13
196	98	32	53	35	41	71	232	5	16
197	104	31	39	31	30	49	180	2	8
198	97	38	50	29	26	54	197	2	10
199	92	28	34	18	33	51	164	3	12
200	122	31	50	23	31	56	191	4	17
201	100	25	44	31	26	46	172	3	11
202	95	23	50	36	26	57	192	5	15
203	102	28	43	36	32	48	187	4	17
204	115	32	43	31	33	41	180	4	18
205	110	24	39	28	28	43	162	1	9
206	96	33	43	32	25	48	181	3	12
207	92	37	51	30	28	63	209	4	15
208	95	31	50	26	37	49	193	4	16
209	105	30	46	31	35	65	207	2	10
210	90	31	47	24	31	50	183	4	14
211	94	37	52	36	33	55	213	4	19
212	98	24	30	29	33	40	156	4	18
213	102	36	49	27	38	54	204	3	13
214	96	26	50	30	25	66	197	5	15
215	109	26	43	28	38	51	186	4	19
216	94	22	44	29	21	39	155	3	12

	Intelligence Scores	Creative Writing and Arts	The Creativity Inventory GIFFI I Challenge Inventiveness	Confidence	Imagination	Many Interests	Total Score	Teachers' Ratings of Creativity	Locus o Control Score
217	120	28	50	33	28	49	188	5	16
218	102	23	46	24	34	39	166	4	17
219	120	29	38	35	24	59	185	4	13
220	98	29	64	38	34	59	224	2	10
221	94	35	47	30	32	61	205	4	14
222	114	32	47	36	36	69	220	4	13
223	93	31	48	32	30	55	196	5	15
224	95	21	41	23	23	53	161	5	15
225	110	27	45	26	36	50	184	4	13
226	112	25	37	22	36	49	169	4	17
227	107	30	40	26	31	56	183	4	17
228	103	31	49	39	30	57	206	4	18
229	105	25	53	25	34	56	193	4	18
230	107	21	41	30	28	37	157	4	16
	24141	6459	10969	6772	7149	11884	43233	756	3131
	104.96	28.08	47.69	29.44	31.08	51.67	187.97	3.29	13.61
	9.42	5.15	8.37	4.16	5.12	9.08	20.92	1.07	3.43

APPENDIX VIII: STATISTICAL TABLES OF NUMBER OF SCHOOLS AND STUDENTS IN THE CITY OF EL-FAYOUM IN EGYPT

(The figures which follow, which are for 1984-5, were obtained from the Statistics Administration in the Education Directorate of El-Fayoum City in Egypt for.

A. Number of Primary Schools (State and Private) and Number of Students in the City of El-Fayoum in 1984-5)

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	105	1144	30240	20013	50253
2	Sinaowres	64	575	16080	8533	24613
3	Itssa	71	671	18746	8245	26991
4	Abshaway	66	700	21491	8363	29854
5	Tamia	37	349	10635	3620	14255
Total		343	3439	97192	48774	145977

B. Number of Schools and Students in Al-Azhar Primary level in the City of El-Fayoum in 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	5	24	494	455	949
2	Sinaowres	4	31	825	465	1290
3	Itssa	7	31	1000	350	1350
4	Abshaway	4	25	717	345	1062
5	Tamia	1	7	248	49	297
Total		21	118	3284	1664	4948

C. Number of Schools and Students in the Preparatory Level (State and Private) in the City of El-Fayoum in 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	30	404	9842	6390	16232
2	Sinaowres	10	193	5256	2527	7783
3	Itssa	12	185	5581	1869	7450
4	Abshaway	16	217	6890	1916	8806
5	Tamia	9	98	3091	720	3811
Total		77	1097	30660	13422	44082

D. Number of Al-Azhar Preparatory Schools and Students in the City of El-Fayoum in 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	3	21	351	398	749
2	Sinaowres	3	11	393	-	393
3	Itssa	2	8	220	-	220
4	Abshaway	1	3	135	-	135
5	Tamia	1	6	198	-	198
Total		10	49	1297	398	1695

E. Number of General Secondary Schools and in the General Secondary Education in the City of El-Fayoum in 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	8	137	2794	2223	5017
2	Sinaowres	6	41	1020	415	1435
3	Itssa	5	28	745	202	947
4	Abshaway	5	36	1133	336	1469
5	Tamia	1	12	387	60	447
Total		25	254	6079	3236	9315

F. Number of Al-Azhar Secondary Schools and Students in the City of El-Fayoum 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	4	36	930	273	1203
2	Sinaowres	1	5	127	-	127
3	Itssa	1	2	22	-	22
4	Abshaway	1	4	110	-	110
5	Tamia	1	2	68	-	68
Total		8	49	1257	273	1530

G. Number of Technical Secondary Schools and Teacher Institutions in the City of El-Fayoum 1984-5

Number	District	Number of Schools	Number of Classes	Number of Students		
				Males	Females	Total
1	El-Fayoum	8	392	8966	5337	14303
2	Sinaowres	3	134	3964	863	4827
3	Itssa	1	25	593	379	972
4	Abshaway	3	73	2263	540	2803
5	Tamia	1	17	469	126	595
Total		16	641	16255	7245	23500

H. Number of Students in the Faculty of Education in the City of El-Fayoum in 1984-5

Subjects	First Year			Second Year			Third Year			Fourth Year			Total		
	M	F	Total	M	F	Total	M	F	Total	M	F	Total	M	F	Total
Arabic	119	136	255	89	75	164	70	69	137	64	71	135	349	342	691
English	31	32	63	11	24	35	19	26	45	14	35	49	75	117	192
History and Geography	41	48	89	60	44	104	64	52	116	53	36	92	218	183	401
Mathematics	181	31	212	176	43	219	112	18	130	112	17	129	581	109	690
Chemistry & Physics	92	96	188	101	119	220	110	120	230	79	95	174	382	430	812
Biology	21	41	62	-	-	-	-	-	-	-	-	-	21	41	62
Total	485	384	869	437	305	742	375	283	658	322	254	579	1626	1222	2848

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