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THE EFFECTS OF EVALUATION EXPECTATION ON CREATIVITY

BY

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ABSTRACT

This study examined the effects of the extrinsic constra of evaluation expectation upon both creativity and techn goodness as evidenced in works of art. Ninety-one grade seven boys were asked to make collages and half were told that their work would be evaluated. Forty-four subjects were told to focus on either the creative or the technical aspects of the task, and twenty-three were given no focus. In addition, two groups expecting evaluation were given specific instructions on how to make either a creative or a technically good collage. As predicted, groups not expecting to be evaluated received judged creativity scores significantly higher than the evaluation expectation groups except in two instances. It was predicted that the group which received specific instructions on how to make a creative collage would have its artworks judged higher in creativity than its control, and this was so. The evaluation expectation group which was asked only to make a creative collage, however, scored the highest means in the experiment both in creativity and technical goodness. No explanation is offered for this unpredictable result.

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I extend my thanks to my committee members: Dr. Duayne Tichenor; Dr. Jay Bishop, who in mystical ways made me aware of my ignorance; and especially to my supervisor, Dr. James Gallagher, who remained supportive and concerned, and gave me a free rein throughout.

To Sam, my friend, lover, and mother of our children, who helped with the study, gave me the time I needed, and was a constant source of encouragement, I express my love.

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The Creativity Problem

Many psychologists have stressed the importance of creativity to human development, and the need for educational institutions to foster its development (Barron, 1963; From, 1964; Maslow, 1962, 1971; Koestler, 1964; Torrance, 1970). Maslow (1956, p.240) equates creativity with the state of psychological health, and this with the self-actualization process.

> There is no exception to this rule. Creativity is a universal characteristic of self-actualizing people. This form of creativeness reaches beyond special-talent creativeness. It is a fundamental characteristic of human nature. It touches whatever activity the healthy person is engaged in.

Gowan (1973) equates the absence of creativity with lack of development into the full powers and freedom of adulthood. With respect to his developmental stage theory, the further back one is related to his appropriate age stage, the more severe is his psychopathological state. Thus the problems which accrue from a lack of creativity range from the complacency of the merely uncreative to the seriousness of complete immobilization and psychosis.

Barron (1975) hypothesizes that the creative imagination may reduce meaninglessness and mitigate the

situation of the 'self alone' in a period of increasing alienation. By strengthening itself, the consciousness will enhance the great forms through which it shows itself evolving: art, science, religion, and community. The problem is not so much that creativity needs to be encouraged, for solitariness and the need to establish meaning and community are its primary motives. Gowan, however, sees as the primary obstacle to individual creative development those social forces which hamper self actualization.

Just as the creative trait is essential to the individual, the creative person is essential to society. In this age of cybernetics it no longer suffices to train the individual for the mundane; the creative man, the man of vision and judgment has become an ever stronger imperative (Guilford, 1962; Torrance, 1965). The issue is no longer man versus nature, technology has settled that, it is now man against himself; that is, man against his destiny. Torrance (1962, pp.32-33) summarizes the reasons why the cultivation of creativity is an endeavor which deserves attention and action:

> First, it is important from the standpoint of personality development and mental health... Secondly, there seems to be little doubt that creative thinking contributes importantly to the acquisition of information and may ultimately be demonstrated to be as important in this respect as memory and similar intellectual functions...Third,

creative thinking is certainly essential in the application of knowledge to daily personal and professional problems...Fourth, I believe that it is tremendously important to society that our creative talent be identified, developed and utilized. The future of our civilization depends upon the quality of the creative imagination of our next generation..

Scientific creativity, which, since the Industrial Revolution, has instigated dramatic changes to our way of life, is in a state of constant disequilibrium. The effects of one invention upset the established order and require the product of another creative insight to regain the balance. Whether one likes it or not, scientific growth is a chain reaction. Paradoxically, however, the very changes it has brought about have blocked it's growth.

A large scale machine production and distribution tends to produce homogeneity just as it tends to produce the urbanization of population out of once scattered rural villages... The mechanics of news gathering and circulation generate a common mental diet. The leveling of classes has resulted in a definite uniformity of garb... This similarity is the outward counterpart and symbol of the forces that make for mental independence. (Dewey, 1930)

This lack of stimulus for creativity may seriously retard the fullest development of an individual, making it difficult and even impossible

for him to adapt successfully to new and unusual situations. (Marksberry, 1963, p.4)

Creativity and the Environment

Considering it's importance, it is not surprising to find considerable social and individual activity related to this catch-all phrase 'creativity'. One has only to scan the titles in a book store to become aware of the reams of literature related to creativity. The majority of these books are of the 'how to do it' variety; 'How to Become a Creative Cook", or "Realizing Your Creative Potential", or "The Guide to Creative Arts and Crafts". There is an implied sense in these titles that creativity is a skill which may be learned by all. This popular social conception of the term is, not surprisingly, also applied in the schools. Workshops are organized purporting to teach teachers to teach their students how to be more creative. It would seem that creativity is seen as a cognitive skill which, like mathematics or science, can be successfully taught provided one uses the proper methods. Educational research is supporting the postulate that an individual's innate creative talent can be nurtured to increase his creative output by deliberate education in creative thinking. (Gowan, 1973; Torrance, 1962). Some research has been devoted to examining environments which seem to foster creativity.

Torrance (1965) conducted a series of experiments in which teachers were instructed to encourage creativity in their pupils in the following ways:

a. Be respectful of imaginative, unusual ideas and questions;

b. Show your pupils that their ideas have value;

c. Occasionally have pupils do something "for practice" without the threat of evaluation;

d. Tie in evaluation with causes and consequences. (p.43)

It was found that students experiencing the application of these guidelines demonstrated significant improvements on creativity tests.

Parnes (1967), on reviewing research concerning 'open' and 'closed' classrooms, and 'permissive' and 'directive' supervisors, concluded that the permissive teacher or supervisor and the 'open' classroom are significantly more conducive to growth in creative behavior than are atmospheres of control.

In a review of research concerning environments supportive of creativity, Taylor (1975, p.316) summarized the following factors:

a. reduction of frustration-producing factors in the environment;

b. elimination of win-lose competition;

c. provisions for support;

d. encouragement of divergent thinking;

e. emphasis on problem-solving and working through a conflict (rather than on generating a harmonious environment);

f. general maintenance of an open environmental structure;

g. minimization of coercion;

h. minimization of enforcement of behvior norms;

i. elimination of environmental threats;

j. acceptance of fantasy;

k. exposure to the risk-taking opinion of others;

l. allowing free communication.

Torrance maintains that the schools can be a positive influence insofar as creative development is concerned. To be effective, however, the total development of the school must be supportive of the creative urge.

Gowan (1968) lists emotional support, permitting risk-taking behavior, showing respect for curiosity and initiative, and heightening sensory awareness as important items for encouraging individual creativity. Rogers (1961) cites psychological safety and freedom as being essential to creative development. Bish (1965, p.99) states "there must prevail a genuine regard for curiosity, imagination, and the inquiring questioning mind." Ellinger (1964) in an examination of environments conducive to creativity, found widespread agreement: those which were friendly, permissive, encouraging and supportive were found conducive to creativity.

However, as Torrance (1962) notes, the majority of North American schools are based upon the premise of authority and such a milieu has been shown to be non-supportive of creativity development.

Getzels and Jackson (1962) found that highly creative students were less popular with their teachers and peer group than high I.Q. students. Implied in this study is the notion that an environment somewhat hostile to the creative personality will stifle the creative urge.

A study by Klein (1975) found that low-anxiety students score higher on creativity tests in open environment-type classrooms than in closed ones.

Personality and behavioral differences between authoritarian type teachers and creative individuals have been shown to have a negative effect on creativity. Elizabeth Drews (1963) found that creative intellectuals received significantly lower teacher grades than was justified by their actual scholastic achievement. A study by Torrance (1965) found that peer disapproval and teacher devaluation were equally potent in subduing divergent thinking.

The general lack of concern shown by most teachers in promoting individual creativity has been reflected in statements of the objectives of teachers at all levels of education. Another study by Torrance (1965) categorizing the types of teaching objectives of educators according to Guilford's mental operations matrix, found only 8% fell into

the higher order divergent thinking or evaluation categories.

Wodtke (1964) identified a group of teachers as high controlling or low controlling. Creative thinking test gains of students of high controlling teachers were compared to test gains of those of low controlling teachers. Wodtke concluded that a high controlling teacher discourages self-initiated pupil talk, verbal creativity, and verbal flexibility, but tends to encourage increased detail, at least in drawings.

Handlin (1962) believes that current grading or evaluation systems encourage memory, accuracy, neatness, and cautiousness, but rarely call upon students to use their ability independently or speculatively to deal with situations in which the answers are not known but must be discovered. Handlin states "that only the reckless will dare to allow questions to draw their thinking in unexpected directions"(p.42).

Personality studies examining creative individuals have pointed to characteristics which distinguish these persons from their peers. MacKinnon (1960) summarized these characteristics. The creative person is: open to experience; free from crippling restraints and impoverishing inhibitions; and independent in thought and action.

Taylor (1962) notes that highly creative people like to manipulate and toy with ideas, and that they are more willing than others to take calculated risks in their work.

Stein (1975, p.88) summarized assessment studies of the creative individual. The following are some of the characteristics of a creative person:

a. he is an achieving person;

b. he has a need for curiosity;

c. he is less inhibited, less formal, less conventional;

d. he is independent and autonomous;

e. he is less authoritarian, more playful, and enjoys undisciplined exploration.

There is a body of empirical research which has attempted to identify specific techniques which result in creative problem-solving, and then develop programs in which people apply these techniques to specific situations.

Synectics (Gordon, 1961) is a direct technique to nurture the creative output of the individual. It achieves this end by increasing the individual's awareness of the mechanisms through which one arrives at novel solutions. Gordon emphasizes the relationship between childhood play and adult creativeness. He quotes Von Lange: "Play is the art of childhood, and art is the mature form of play". (Gordon, 1961, p.119) In play, pleasure is not dependent upon the purpose of the activity, that is, play is an end in itself. If the relationship between adult creativity and childhood play is valid, if creativity is a manifestation of childhood play in the adult, then it is implied that in all creative activity the process itself is satisfying. This

implication is highly relevant to our schools, which adhere to a training program based on extrinsic motivation. According to the overjustification hypothesis, (Lepper, Greene, & Nisbett, 1973) extrinsic motivation can only have a detrimental effect upon creativity. Schools, if they are to actively encourage creativity, would have to change their emphasis on training to one of stimulating learning.

Parnes (1962) advocates the use of brainstorming, a technique which encourages an outpouring of ideas in an evaluation-free milieu. The generation of new and unusual ideas may spark an association with other ideas which may eventually lead to a solution, but the list of unusual ideas in itself is just that, a list of ideas, not a list of solutions.

In sum, the creative environment has been described as that which does not hold back the individual by criticism of unconventional thought or arousal of fear of failure. The crucial elements of the creative environment are freedom from constraint and intellectual playfulness. The 'open' classroom, the teacher who is receptive to unusual ideas, the environment which minimizes competition and coercion.. all of these can contribute to a personal sense of freedom and a willingness to become involved and play with ideas in an unstructured way.

Creative Freedom

Humanistic psychologists view creativity not as a cognitive skill but as a trait correlating to the freedom of the mind. For Abraham Maslow (1971) the concept of creativeness and the concept of the healthy, self-actualizing, fully human person are synonymous. The Maslowian concept is a holistic approach to creativity. Where the ad hoc society would look to a particular human factor in solving a problem, the holistic approach would examine the whole problem of the transformation of character, the full development of the whole person.

According to Maslow, creativity is not the making of a work of art but a way of approaching life. In this respect the creative child is seen as a mentally healthy child. Maslow's concept is an approach to living one's life. The basic needs of the healthy person are satisfied, and he or she is free, spiritually at least, to constantly grow and change. This growth is characterized by the attainment of the heirarchy of "being" needs outlined by Maslow.

What we are dealing with here are two concepts of creativity. Maslow thinks of it in terms of a total life, while others think of it as a happening, an event in a moment of time. Maslow (1962) distinguishes between this life of creativity, which he terms "self-actualizing" creativeness, and "special-talent" creativeness. The latter is a result of high abilities in special fields, and ordinarily restricts production to those fields. The former,

springing much more directly from the personality, shows itself as an effect of positive mental health, and appears as creative flexibility and free energy to accomplish the ordinary affairs of life in a creative way.

Transactualization (Taylor, 1975) is an extension of the theories of self-actualization of Jung, Maslow and Rogers. However, whereas self-actualization is essentially a psychological theory, transactualization lends itself more to a psychosocial system, i.e. indicating the nature of the influence of the person in shaping the external environment. In transaction the person shapes the environment, while in reaction the environment shapes the person. Creative motivation "is seen as a form of perceptual transaction in which the environment becomes altered or reorganized in accordance with personal perceptions". (Taylor, 1975, p.304) Taylor describes the creative person as essentially transactive, that is, "capable of actualizing transformation of environmental problems into products compatable with his disposition style". (Taylor, 1975, p.302)

Amabile (1978) conceives of creativity as being dependent upon three general types of factors; skills, effort, and motivation. Individual difference research and personality research have dealt with skills and effort, but motivation (in this sense meaning a creative or uncreative attitude toward a given task) has seldom been considered. What is it that leads people to be creative? What role do specific social factors play?

The idea central to this thesis is to study the motivation to be creative by examining the creativity of work produced under various conditions of social control. Thus, it is hypothesized that there will be a correlation between certain environmental conditions and the degree of creativity of works produced by individuals under the effect of those conditions.

It is also the intent of this study to examine the impact of social control or it's absence upon an individual's cognitions about himself and his environment. Conditions of social control, then, affect an individual's cognitions about himself and his environment, and this cognitive state affects his motivation to be creative.

The environmental factor with which this study is concerned is the effect of evaluation expectation on creativity. The creative act demands an intense concentration on the task itself. However, when the task is a means to an end, such as in the case of achieving grades, one is likely to become involved in the task only to the extent that a product is produced satisfactory to the grading criteria. Tumin (1954) and Eiseman (1964) state that nothing is so hostile to the maximum development of creativity as the competitive grading system which prevails in schools. Since grading is a threat which elicits defensiveness and the denying to awareness of some areas of experience Rogers (1954) insists that external evaluation should be absent if creativity is to flourish. These views

are supported by Handlin (1962) who holds that current evaluation systems encourage memorization, accuracy, neatness and cautiousness, but rarely ask the student to use his ability to independently discover answers and solutions to new problems.

In that schooling has traditionally concerned itself with the transmittance of specialized bits of information (a phenomenon which Bruner (1977) terms the decontextualization of knowledge) one can anticipate that educators will be attracted to the special-talent concept of creativeness. This peculiar "special-talent" creativity in individuals can be considered as a reaction to environmental influence.

Behavior Modification

There are a few studies which support the view that creativity can be enhanced by the introduction of external reinforcement.

In one type of behavior-modification study (Glover & Gary, 1976) children were divided into teams to participate in a word game. Appropriate responses were awarded points which could be used to buy cookies or other privileges. The criteria for reward was decided on the basis of the fluency, flexibility, elaboration, or originality of the response. All four aspects were determined to be under experimental control. Under extinction, each aspect fell to baseline or below.

In another type of study (Johnson, 1974), children were placed in control and experimental groups. The experimental group was rewarded for good performance. Both groups responded to a standardized creativity test, and the rewarded group performed significantly better on it than did the control group.

In both of these studies, however, it is questionable that creativity is being measured. According to the description of creativity previously given, it's actualization is dependent on both a state of freedom in thought and playful involvement. In the behavior modification studies described the experimental subjects were given specific instructions on how to perform on one or two aspects which are often characteristic of creative performance. In the transactualization sense, they have reacted to the environmental constraints.

Creativity and Intrinsic Motivation

• Intrinsic Motivation Research

An activity is generally said to be intrinsically motivated if there is no apparent external reward associated with the activity. This study will be concerned with intrinisic motivation as it is manifested in the degree of creativity and technical competence of the product. According to Kruglanski's (1975) theory an extrinsically

motivated person, in being goal-oriented, will engage in an activity only as a means to an end, and not for the sake of the experience of the activity itself. The nature of the creative act, however, demands a single-minded concentration upon the activity. As a higher order cognitive function, creativity will be the first to be adversely affected by external stimuli, such as evaluation expectation.

The extrinsic incentive must be seen by people as such before their behavior will be adversely affected. Praise, for instance, which often has a positive affect on peformance, is usually associated with the pleasurable aspects of the task at hand, and is thus not seen as a reward. DeCharms (1968) argued that performance of an activity in order to obtain an extrinsic reward eventually results in the belief that the reward is the cause of the behavior. Thus, the behavior will be dependent on the expectation of the extrinsic reward, and intrinsic motivation will wane.

Recent research has examined the effect of extrinsic incentives on intrinsic motivation. Self perception theory (Bem, 1965, 1967; Kelly 1967) proposes that to the extent that the external reinforcement contingencies controlling a person's behavior are salient, unambiguous, and sufficient to explain it, the person attributes his behavior to these controlling circumstances. But if external contingencies are not perceived, or if they are unclear, invisible, and psychologically insufficient to account for his actions, the

person attributes his behavior to his own disposition, interest, and desires.

One of the heuristic implications of this theory is the "overjustification hypothesis" (Lepper et al., 1973)--the proposition that a person's intrinsic interest in an activity may be undermined by inducing him to engage in that activity as an explicit means to some extrinsic goal. Recent research (Lepper et al., 1973; Kruglanski, 1975; Condry, 1977; Deci, 1971, 1975) has supported the overjustification hypothesis.

Although these studies have utilized reward as the extrinsic goal, the production of an overjustification effect is not restricted to that factor alone. The imposition of other forms of salient constraints, not involving extrinsic rewards, have also been shown to produce overjustification effects (Amabile, DeJong, & Lepper, 1976; Amabile, 1978; Lepper & Greene, 1975; Lepper & Greene, 1977). The independent variable in all of these studies is the perception of one's engagement in an activity as a means to a salient external end. Thus, the independent variable is a cognitive event rather than a reinforcement procedure.

There are a few studies which directly test the hypothesis that the imposition of extrinsic constraints will result in decrements in creativity. A study of the effects of rewards on problem-solving performance (McGraw & McCullers, 1974) found that rewarded subjects took significantly longer to break set in solving a Luchins water

jar problem than did non-reward subjects.

A study of Kruglanski, Friedman and Zeevi (1971) determined that non-rewarded subjects produced more creative responses and expressed greater enjoyment for the experiment than did rewarded subjects.

In an experiment where children made drawings under either reward expectation or no reward expectation (Lepper et al., 1973) the detrimental effect of the expected-reward procedure was manifest both in quality of performance during the experimental sessions and in subsequent unobtrusive measures of intrinsic interest in the classroom setting.

In a study of college students working on an art activity either with or without the expectation of external evaluation (Amabile, 1978), subjects expecting evaluation produced artworks significantly lower on judged creativity than did subjects in the nonevaluation control groups.

The Behavior Modification and Overjustification Paradigm

Depending on the type of activity, extrinsic constraints can also have a positive affect on a person's performance of an activity. McGraw (1978) found that tasks involving mental multiplication, serial learning, and paired-associated learning are exceptions to the overjustification theory. In all three cases task solutions are algorithmic. Examples of algorithmic solutions commonly involved in behavior modification studies are marble

dropping, lever pressing, and vigilance. Contrary to these types are the functional-fixedness problems, that is, heuristic problems for which one must develop the algorithm. In tasks requiring insight and creativity, nearly the entire problem-solving stage is taken up by the heuristic stage.

Problems involving algorithmic solutions can generally be characterized as having little intrinsic attraction. "Because these (algorithmic) tasks provide no challenge to intellectual competence and only minimal challenge to perceptual-motor competence, we judge them to be at least relatively unattractive for subjects" (McGraw, 1978 p.41). In that tasks requiring algorithmic solutions are unattractive, reward has the effect of improving subject performance on them simply because nonrewarded subjects would not try as hard as rewarded ones. Rewarded subjects will presumably engage wholeheartedly in any task if they perceive the reward as equitable to the task.

Now, if subjects are given explicit instructions on how to perform creatively on a set task, then the task solution becomes algorithmic in nature. Of course, one must question whether true creativity can occur when the subject is following explicit instructions on how to be 'creative'. In that algorithmic tasks are generally perceived as unattractive, the intrinsic motivation necessary to accomplish the task would be low. External motivation, such as reward or evaluation, would increase the subject's motivation to perform the algorithmic task, but there would

not be a corresponding increase in intrinsic motivation. The subject would still perceive the task as uninteresting.

Definitions

Before a method of assessing creativity is discussed, it is necessary to define the term creative. Webster's dictionary defines creative as having the quality of something created rather than imitated or assembled. This definition suggests that the distinguishing feature of creative objects is their novelty. Other psychological dictionary definitions fall very much in line with this. The Encyclopedia of Psychology (1972) defines creativity as "the ability to see new relationships, to produce unusual ideas, and to deviate from traditional patterns of thinking. In the Psychology 73/74 Encyclopedia (1973) creativity is described as the ability to discover or produce new solutions to problems, new inventions, or new works of art.

Simon (1967, p.44) offers the following definition of creativity. "We call human problem-solving creative to the extent that one or more of the following conditions are satisfied:

a. if the product of the thinking has novelty and value either for the thinker or for his society;
b. if the thinking is unconventional, in the sense that it requires modification or rejection of previously accepted ideas;

c. if the thinking requires high motivation and persistence, taking place either over a considerable span of time or at high intensity;

d. if the thinking deals with or solves a problem which, initially as it was posed, was a vague and ill-defined problem, so that part of the task of the creative thinker was to formulate the problem itself, to give it structure.

The creative product is the consequence of an unusual idea, and that unusual idea is the result of the formation of associative elements into new combinations (Mednick, 1963). In this respect, creativity is more than an unusual idea, it is the product of the impulses and ideas of the personal conscious. Taylor (1955, p.171) lists the following basic assumptions underlying creativity investigation:

1. Creativity is the resultant process that occurs within the individual. In general one tends to judge the creativity of others in terms of "product" that they have produced, or stated differently in terms of the "distances" between what they have produced and the status of the field before they come on the scene. Such an orientation causes us to overlook the fact that creativity is a process. It is a process of hypothesis formation, hypothesis testing, and the communication of results.

2. Creativity is the resultant process of social

transaction. Individuals affect and are affected by the environments in which they live. They do not interact with their environments without changes occurring in both directions.

3. For purposes of empirical research our definition of creativity is as follows: Creativity is that process which results in a novel work that is accepted as tenable to useful or satisfying by a group at some point in time.

For the purpose of this study, Amabile's definition will be adopted: "A person is creative to the extent that he or she produces a novel response or expression, provided that the response is, in the assessment of relevant judges, not only novel but also appropriate. Likewise a product is creative if, in the assessment of relevant judges, it is both novel and appropriate" (Amabile, 1978, p.43).

This definition is based upon the following assumptions: there are degrees of creativity, but only one basic type; the source of judgement for defining a product as creative must be other relevant individuals; and anyone with normal human capacities is capable of using them to produce creative products. This last assumption is essential to the design of the present study; consequently, more will be said about this.

Early works examining creativity, especially those dealing with personality characteristics and ethnographics, focused primarily on prominent social individuals. It was

assumed that creativity was a special gift possessed only be an elite few. More contemporary research postulates that creative potential, like intelligence, is common to all. Maslow (1962, p.132) states "This kind of primary creativeness is very probably a heritage of every human being. It is a common and universal kind of thing. Certainly it is found in all healthy children". Guilford (1967) writes that creative talents are probably widely distributed to different degrees throughout the population. Torrance (1965) states that levels of creative functioning from one culture to another can be explained logically on the basis of the nurturing influences of the cultures.

Most current conceptions of creativity, then, reject the elitist notion in favour of the universality of the creative potential. Differences in creativity among both individuals and cultures are attributed to environmental influences.

Assessment

The chief unresolved difficulty in studying creativity is that no systematic, valid, or commonly agreed-upon way of measuring creativity has yet been devised. How can one establish that a response is indeed creative? And to what degree is that response creative? What method can be used to validate the social appropriateness of the response?

Most studies attempting to measure creativeness make use of the objective type creativity tests. The Torrance Tests of Creative Thinking (TTCT) are among the most popular of these. They were designed to measure four aspects of "creative thinking" - fluency, flexibility, originality, and elaboration. However, the selection of these aspects do not seem to be based on a systematic theory of creativity. (Baird, 1972) and one is left to question the relative importance of these aspects to creative thinking. Amabile (1978) proposes three factors as necessary for creative activity: knowledge and skills, application of effort, and intrinsic motivation. Tests such as the TTCT tend to depend heavily on certain skills, such as literary composition or drawing skills. There would seem to be little room left in such tests examining the other two factors proposed as essential by Amabile: effort and intrinsic motivation. Intuitively, it is disturbing to measure several separate and discrete responses and then combine them in some way to represent a concept as complex as creativity.

In defence of a subjective method of evaluating creativity Jackson and Messick (1965) differentiate between the 'correctness' of a response, and the 'goodness' of a response. Judgments having to do with the worth or goodness of a person's response deal with the degree to which certain subjective and psychological criteria have been satisfied. Creative responses are 'good'; they satisfy subjective criteria and are responsive to a wide range of judgmental

standards.

Judgments having to do with the correctness or rightness of a person's response usually admit only one answer. Intelligent responses are 'correct'; they satisfy objective criteria and thus may be considered right or wrong.

Most current tests of creativity fail to distinguish between the concepts of good and correct. For example, in the Remote Association Test developed by Mednick (1963) the subject is presented with three words, such as surprise, line, and birthday. He is asked to find a fourth word which could serve as an associative link between these disparate words. For instance, the only correct answer to this example is "party". The number of correct answers is used as a measure of creativity.

Jackson and Messick argue that the answers instead reflect a measure of intelligence, because they are "correct". By accepting the Gestalt concept of creativity, or Jackson and Messick's hypothesis that transformation, as a response property of creativity, involves the transcending of traditional boundaries and limitations, one rejects the pencil and paper type of test which correlates creativity with the number of "correct" answers.

Ultimately, then, creativity must be judged subjectively. Amabile (1978) devised an assessment method whereby she began with holistic, subjective judgments of a product's creativity, and then identified the component

features of the product which predict the creativity assessment.

This subjective method of assessing creativity does not depend upon specialized skills. In a pretest, Amabile had twenty-two seven to eleven year olds make collage-type designs using identical sets of material. They were told that they could use the materials in any way they wished to make a design on the cardboard. Seven artists then evaluated each of the twenty-two designs on twenty-three different artistic dimensions. Each dimension was defined for the judges. Reliabilities of the subjective measures were calculated and found to be quite high. A factor analysis was carried out on the average ratings for each design on each dimension, and a clear pattern emerged: two orthogonal factors were obtained, one which can be labelled "creativity" and the other "technical goodness". This art activity, then, provides a measure of creativity which allows reliable subjective assessment, does not depend heavily on specialized skills, and can be separated from measures of technical goodness or competence

2. PLAN OF THE STUDY

Purpose and Predictions

In review then, the weight of the literature presented supports the view that a salient external constraint leads, in general, to lower creativity. However, only one study could be found (Amabile 1978) which tested the hypothesis using evaluation expectation as the independent variable. The main purpose of this study was to test the assumption, in accordance with the overjustification hypothesis, that evaluation expectation would have a negative effect on creativity, unless the subjects were told specifically how to perform creatively.

The specific extrinsic constraint of evaluation expectation was chosen because of it's relevance to the classroom setting. The allocation of marks has been a technique long used by teachers to motivate their students. In a training type milieu, such as the learning of skills, where the problem solution is algorithmic in nature, grades can be effective in motivating students. However, in an environment which encourages heuristic solutions to problems, (i.e. - creative solutions) the imposition of an external constraint such as evaluation expectation will serve to distract the individual from the task at hand, and the student will peform more to meet the criteria imposed by the external constraint. Because of the heavy emphasis upon

grading as a method of motivating students, a study demonstrating the effects of evaluation expectation on creativity could have significant implications for education. The main focus of the study centers around the effects of evaluation expectation on creativity.

As noted earlier, there is a body of literature which supports the hypothesis that increases in creativity result from the imposition of extrinsic constraints. For instance, subjects are given explicit instructions on how to perform more creatively, and then are offered a reward to complete the task. It is questionable, however, whether their behavior can be considered as 'creative' considering that they are following specific instructions in solving the problem. Their task solution would seem to be algorithmic in nature.

The present study attempted to determine both decrements in creativity in accordance with the overjustification hypothesis and increments in creativity by a behavior modification procedure.

Finally, this study was designed to explore possible differences in the ways motivational state affects creativity and other aspects of task performance.

According to the overjustification hypothesis previously discussed, a person's intrinsic interest in an activity will be undermined by inducing him to engage in that activity as an explicit means to some extrinsic goal. It would be expected that not only will evaluation

expectation have a detrimental effect as discussed earlier on the creativity of the product but that there will also be a corresponding decrease in that person's intrinsic motivation.

In the case of the behavior modification procedure, where task solutions in such conditions are rigid and defined, the mental freedom necessary for the true creative process will be absent. Although the problem solutions in this case may be judged as creative, it is not expected that there would be a corresponding increment in intrinsic interest. Because the person is working to meet the criterion of the salient extrinsic constraint, his or her interest in the task at hand will remain low.

Technical goodness was chosen as the specific task performance aspect to be compared to creativity, since in a previous study (Amabile, 1978) it made a distinct cluster from creativity on a varimax rotation. In schools, where the emphasis is on assimilation of facts and 'correct' responses, technical goodness is used as a criterion of success.

The experimental activity chosen for this study was collage making. Amabile (1978) in both her pretest and experiment, derived high correlations among the judges evaluating the collages, and significant differences between the various evaluation and non-evaluation groups. Collage making is a task which does not require any specific previously acquired skill. Anyone can do it, provided they

have normal psycho-motor coordination. No attempt was made to control the time of day when the activity was conducted. No attempt was made to control for differences among individuals when performing in a group as compared to being alone.

It is recognized that a school environment may very well have a significant effect on an individual's performance of the activity. However, this environmental factor was common to all of the subjects in the experiment. For this study, the assumption was made that all subjects would be affected in a similar way and to the same degree by the school environment. This need not necessarily be the case, however. One might intuitively expect high achievers to experience a greater sense of freedom or ease in the school setting than low achieving students, who may operate at a high anxiety level while in the setting. It is beyond the scope and resources of this study, however, to control for this factor. The assumption was made that each experimental group was representative of the student population.

The Experimental Design

Within the experimental design, there were two basic conditions: a control condition consisting of those who were not expecting to be evaluated, and an experimental condition consisting of those who were expecting to be evaluated. It

was predicted that the non-evaluation subjects' collages would be judged higher on creativity than the works of the subjects expecting evaluation. The exception to this was the works of the behavioral modification group of subjects who were given explicit instructions on how to make creative collages.

These 'creativity' instructions derive from the artistic dimensions which, in a factor analysis of all the dimensions, in Amabile's study, grouped closely together along a 'creativity' factor. To elaborate, Amabile had a group of artists evaluate the collages of her study on twenty-three artistic dimensions: creativity; novel materials; novel idea; liking; aesthetic appeal; pleasing shapes placement; pleasing colors; display; technical goodness; organization; neatness; effort; plann ng; balance; variation in shapes; representationalism; asymmetry; expression of meaning; silliness, detail; spontaneity; movement; and complexity. In a factor analysis of these judgments, a number of these dimensions clustered along a creativity factor, and others clustered along a technical goodness or technical competence factor. Those dimensions which clustered closely with the pretest judges' ratings of creativity were: novelty of the idea; novelty in the use of materials; effort evident; amount of variation in the shapes used, asymmetry of the design, amount of detail in the design, and complexity of the design.

The specific creativity instructions were derived from the above creativity dimensions. Although the creativity behavioral modification group was expecting to be evaluated, it was not predicted that there would be decrement in the creativity of their collages. Included in this set of 'creativity' conditions was a group which was told only that they would be evaluated on creativity. This was the usual overjustification group, and it was expected that evaluation expectation would have a detrimental effect on the creativity of the art works. The control group for this set of conditions was asked to make creative artworks, but was told nothing about being evaluated.

Included in the experimental design, and analogous to the aforementioned creativity focus set of conditions was a third set consisting of groups which received instructions for making a technically competent collage. In the case of the group given specific instructions on how to make a technically good collage, instructions were derived from those dimensions which clustered closely in the pretest judges' ratings of technical competence. Those dimensions were: neatness of the design; balance of the design, amount of planning evident; level of organization; representationalism; and literal or symbolic expression of meaning. This group was told specifically what to do to receive a good evaluation on technical goodness. Another group was told simply to make technically good collages which will be evaluated. The control group for this set of

conditions was told to make technically good collages. While it was predicted that creativity would be adversely affected by evaluation expectation (except in the behavioral modification group) it was not expected that technical goodness would be adversely affected by expectation of technical evaluation.

A questionnaire designed to measure the subjects' attitudes to the experimental task was used to arrive at a measure of intrinsic motivation. It was predicted that a positive correlation would be found between intrinsic motivation and creativity, except for the specific creativity instruction-evaluation group, which would produce works rated high on creativity despite low instrinsic motivation.

Summary

There were eight conditions in this study, which can be conceptualized in a two-by-three factorial scheme, with two additional factors (Figure 1).

Condition #1 was told to make a collage and that they would not be evaluated.

Condition #2 was told to make a technically good collage which would not be evaluated.

Condition #3 was told to make a creative collage which would not be evaluated.

Condition #4 was told to make a collage which would be

Figure 1
The Experimental Design

Instructions Focus

Evaluation Expectation	None	Technical	Creativity
Absent	(1)* 12**	(2) 11	(3) 12
Present	(4) 11	(5) 10	(7) 11
		(6) 12	(8) 12
		Specific Technical	Specific Creativity

* indicates condition number
** indicates condition size

evaluated.

Condition #5 was told to make a technically good collage which would be evaluated.

Condition #6 was given specific instructions on how to make a technically good collage. They were told the collage would be evaluated.

Condition #7 was told to make a creative collage which would be evaluated.

Condition #8 was given specific instructions on how to make

a creative collage. They were told the collage would be evaluated.

In order to minimize variations in the themes of the design, all subjects were told to make collages which would convey a feeling of silliness.

A rationale for making the collages was devised for the three non-evaluation groups. They were told that the purpose of the exercise was to provide an experience in order to answer a questionnaire pertaining to the subjects' moods during the activity.

The independent variable in this study was evaluation expectation or it's absence. Subjects were told that their collages would either be evaluated or not be evaluated.

The dependent measures were as follows:

a. measures of creativity (judged);

b. intrinsic interest measure (questionnaire);

c. measures of technical goodness (judged);

The following results were predicted.

Creativity. It was hypothesized that the collages of those groups expecting to be evaluated would be judged less creative than those of the groups not expecting evaluation. However, in the case of the collages of the creativity behavior modification group (condition #8) a decrement in creativity would not be evident despite the subjects' expectation of evaluation.

Intrinsic Interest. It was hypothesized that there would be a positive correlation between the judged creativity of the

artworks and the level of intrinsic motivation as derived from the attitude questionnaire. The exception to this would be the creativity behavior modification group, which would display relatively low intrinsic motivation despite high judged scores on the creativity of their works.

Technical Goodness. It was hypothesized that collages of the technical goodness evaluation-expectation groups (condition #5 and #6) would be judged higher in technical goodness than the non-evaluation expectation group (condition #2).

The Null Hypotheses

1. There will be no significant differences in creativity ratings between the collages of the subjects expecting to be evaluated and those not expecting to be evaluated.
2. There will be no significant differences in technical goodness ratings between the collages of the subjects expecting to be evaluated and those not expecting to be evaluated.
3. There will be no correlation between subjects' intrinsic interest as measured by a questionnaire and their rated creativity on the collages.

3. METHODOLOGY

Subjects

Subjects were ninety-one Grade eight students. The school which they attended served a middle class Edmonton suburb. Only male students were selected to eliminate variances in creativity due to sex. The subjects were tested in their industrial arts classes. Because of the small class sizes, it was possible to have each class represent a condition. The experiment was conducted by a female experimenter.

Procedure

Eight Grade eight classes were randomly selected from the mark book of an industrial arts teacher. These classes were then randomly assigned experimental condition numbers. One week before the actual experiment the experimenter spent one period (forty-five minutes) with each class to accustom them to her presence and working with paper. During this time the students cut out the shapes which they would be using in making the collages.

The following week the experimenter conducted the actual testing, one class at a time, during their regularly timetabled industrial arts class. Because the experimental task and industrial arts tasks are both hands-on experiences, it was hoped that the students would not

perceive the collage making as alien to the everyday school activities.

Previous to each class, the experimenter arranged the desks in such a way as to minimize the effect of students observing others' works. Once the class was settled, the experimenter passed out to each student a bottle of glue, a white sheet of cardboard fifteen-by-eighteen inches, and an envelope containing various pieces of colored paper. Specifically, each envelope contained one hundred and seventy pieces of paper in twelve different colors (black, grey, purple, red, orange, royal blue, blue, green, yellow, magenta, brown and white) consisting of the following shapes: small square, large square, triangle, five different sizes of circles, two sizes of strips, pie shape, and three arch shapes.

The subjects were then given a copy of instructions pertaining to the condition (group) they were in. The experimenter then read out the instructions and explained any terms not understood by the students.
The instructions for each experimental condition were as follows:

> Condition #1. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.
>
> We would like you to make a design which conveys a feeling of silliness.

We are not interested at all in the activity itself or what you do with the activity. We are only interested in the mood you report on the questionnaire. You will NOT be graded on your collage. So we do not care about the design itself at all,--its only purpose is to provide you with this experience so we can see how it affects your mood.

Condition #2. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There are two more important points that I should make clear before you begin.

First, we would like you to concentrate on the technical aspects of the activity, so try to make your design as technically good as possible, in terms of working with the materials and forming the design.

Second, we are not interested at all in the activity itself or what you do with the activity. We are only interested in the mood you report on the questionnaire. You will NOT be graded on your collage. So we do not care about the design itself at all,--its only purpose is to provide you with this experience so we can see how it affects your mood.

Condition #3. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There are two more important points that I should make clear before you begin.

First, we would like you to concentrate on the creative aspects of the activity, so try to make your design as creative as possible in terms of working with the materials and forming a design.

Second, we are not interested at all in the activity itself or what you do with the activity. We are only interested in the mood you report on the questionnaire. You will NOT be graded on your collage. So we do not care about the design itself at all,--its only purpose is to provide you with this experience so we can see how it affects your

mood.

Condition #4. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There is one more important point that I should make clear before you begin.

Your final design will be evaluated. Five artists from the University of Alberta will be coming in to judge each artwork. They will make a detailed evaluation of your design, noting the good points and criticizing the weaknesses. These grades will be given to Mr. Palmer.

Condition #5. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There is one more important point that I should make clear before you begin.

Your final design will be evaluated. Five artists from the University of Alberta will be coming in to judge each artwork. They will make a detailed evaluation of how technically good your design is, noting the good points and criticizing the weaknesses. These grades will be given to Mr. Palmer. So try to make your design as technically good as possible in terms of working with the materials and forming the design.

Condition #6. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There is one more important point that I should make clear before you begin.

Your final design will be evaluated. Five artists from the University of Alberta will be coming in to judge each artwork. They will make a detailed evaluation of how technically good your design is, noting the good points and criticizing

the weaknesses. These grades will be given to Mr. Palmer. So try to make your design as technically good as possible in terms of working with the materials and forming the design.

Specifically, they will be looking for these six things:
(1) the neatness of the design;
(2) the balance of the design;
(3) the amount of planning evident;
(4) the level of organization in the design;
(5) the presence of actual recognizable figures or objects in the design;
(6) the degree to which the design expresses something to them.

Condition #7. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There is one more important point that I should make clear before you begin.

Your final design will be evaluated. Five artists from the University of Alberta will be coming in to judge each artwork. They will make a detailed evaluation of how creative your design is, noting the good points and criticizing the weaknesses. These grades will be given to Mr. Palmer. So try to make your design as creative as possible in terms of working with the materials and forming the design.

Condition #8. You'll be using these colored pieces of paper to make a design (called a collage) on this cardboard. Please use only the materials in front of you to make the design. You may use them in any way you want, however many of them you'd like, and glue them on the board in any way that you wish.

We would like you to make a design which conveys a feeling of silliness.

There is one more important point that I should make clear before you begin.

Your final design will be evaluated. Five artists from the University of Alberta will be coming in to judge each artwork. They will make a detailed evaluation of how creative your design is, noting the good points and criticizing the weaknesses. These grades will be given to Mr. Palmer. So try to make your design as creative as possible in terms of working with the materials and forming the design.

Specifically, they will be looking for these six things:
(1) the novelty of the idea;
(2) the novelty shown in the use of materials;
(3) the amount of variation in the shapes used;
(4) how asymmetrical the design is;
(5) the amount of detail in the design;
(6) the complexity of the design.

The subjects were then told to proceed with the task. They were given twenty minutes to complete it. All subjects were finished in this time. The collages were then collected and a questionnaire was distributed to each subject. It consisted of the following questions:

a. Did you feel that you were doing the design because the task was interesting, or because the instructions given required it to be done?

b. Was the collage making more like work or more like play?

c. How much fun did you have doing the collage?

d. Do you like your collage?

e. Did you feel pressured while doing the collage?

All five questions were derived by Amabile (1978) from a factor analysis of questionnaire items administered in her experiment, and all correlated significantly with one another. The wording of the questions was modified for this experiment due to the difference in sophistication between Amabile's university student subjects and the 13 year old subjects of this experiment. Subjects answered each question by circling the appropriate number on a five point scale.

Judging

All graduate and faculty artists in the Department of Art and Design at the University of Alberta were sent a list of the sixteen artistic dimensions used in Amabile's experiment, and asked to sort them according to their importance to creativity and to technical goodness. The intent was to choose judges who had compatible conceptions of creativity and technical competence. However, the responses varied widely, and in order to ensure a large enough number of judges, all those artists who completed the sort were asked to volunteer to judge.

The judges were five female and eight male artists. They were told only that this was an experiment to measure the effects of evaluation expectation on creativity. No mention was made of the experimental design. The collages were randomly identified with numbers from one to ninety-one, and hung on the walls of a room in numerical order. They were left up for ten days.

An artist was brought into the room and given an instruction sheet describing the judging task. After this was read the experimenter clarified any questions the artist might have concerning the task. The experimenter then left the artist alone in the room to evaluate the collages. The evaluation task proceeded as follows. On a clip board was stacked sixteen optical score sheets with ten response circles per question. Attached to the score sheet was a definition of the artistic dimension which that sheet

represented. The sixteen score sheets were randomly stacked for each of the thirteen judges. The sixteen artistic dimensions judged were: 1) expression of meaning; 2) degree of representationalism; 3) silliness; 4) detail; 5) degree of symmetry; 6) planning; 7) novelty of the idea; 8) balance; 9) novelty in the use of materials; 10) variation of shapes; 11) effort evident; 12) complexity; 13) neatness; 14) overall organization; 15) creativity and 16) technical goodness. Beginning with the top sheet a judge would read the definition of that dimension, have a brief look at all the collages with regard to that definition, and, beginning with collage #1, evaluate that collage on that dimension on a ten point scale. After evaluating the ninety-one collages on the first dimension he would do the same thing for the next dimension in the pile on the clip board, and so on. Judges were told they should only spend three to four seconds on a collage, attempt to keep the dimensions separate in their mind when evaluating, rate the designs relative to one another on each dimension, and use the entire scale in making ratings. Judges usually did not finish the evaluation task in one session, and would come back at their own convenience to complete the judging.

4. RESULTS

Judging

Reliability

Each of the 13 judges rated the 91 collages on each of the 16 artistic dimensions: expression of meaning; representationalism; silliness; detail; asymmetry; planning evident; novelty of the idea; balance; novel use of materials; variation of shapes; effort evident; complexity; neatness; overall organization; creativity; and technical goodness. A Spearman-Brown interjudge reliability was calculated for each dimension. The reliabilities were quite high (Table 1): the mean reliability was .84. Consequently, the measures on every artistic dimension were included in the analysis.

Factor Analysis

A factor analysis (varimax rotation) was performed on the 16 dimensions of judgment to determine if the dimensions clustered in a 'creativity' grouping and a 'technical goodness' grouping. As is evident in Figure 2, the technical goodness grouping consists of the following dimensions: planning evident; balance; neatness; overall organization; and technical goodness. The creativity grouping consists of: detail; novel use of materials; variation of shapes; effort

Table 1
Interjudge Reliabilities for 13 Judges

Dimension of Judgment	Reliability
Expression of meaning	.81
Representationalism	.95
Silliness	.73
Detail	.83
Asymmetry	.95
Planning	.90
Novelty of the idea	.84
Balance	.78
Novel use of materials	.88
Variation of shapes	.83
Effort evident	.85
Complexity	.80
Neatness	.88
Overall organization	.78
Creativity	.80
Technical goodness	.82

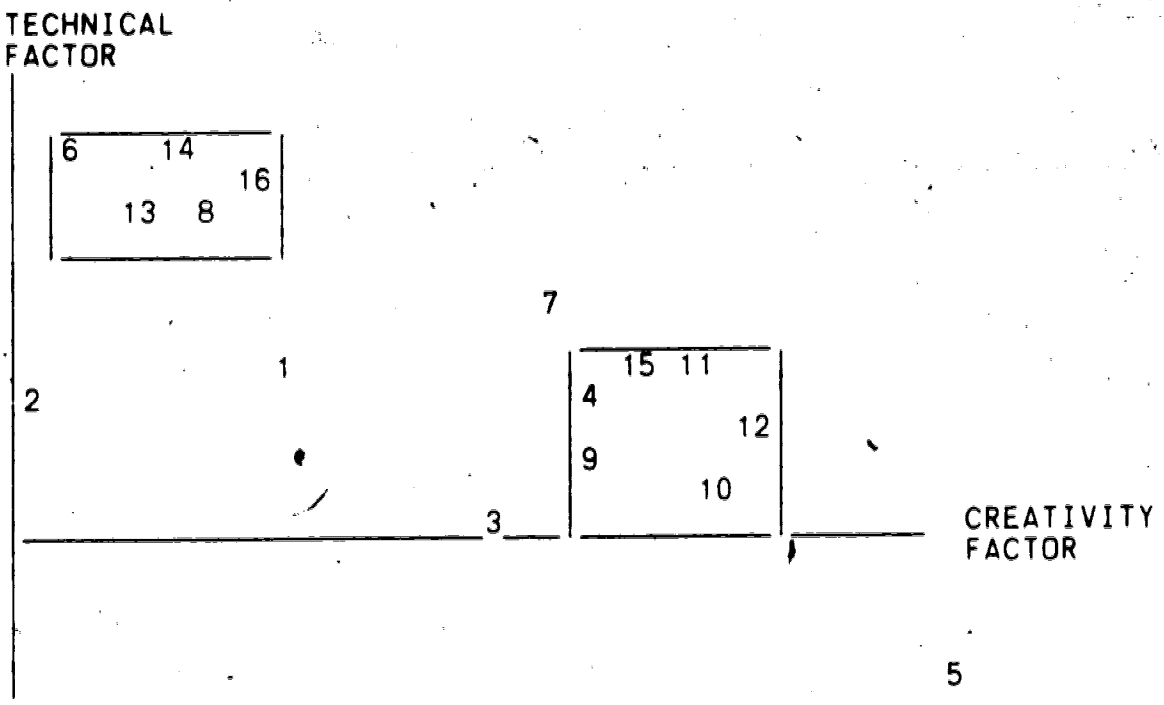
evident; complexity; and creativity.

The dimensions of expression of meaning, representationalism, silliness, asymmetry, and novelty of the idea fell outside of the two groupings and were ignored in the subsequent analysis of data.

Method of Analysis

Ninety-one subjects represented the eight experimental conditions in this study. Each condition (no focus-no evaluation expectation, no focus-evaluation expectation, etc.) consisted of 10 to 12 subjects. Thirteen judges evaluated the 91 collages done by the subjects on each of

Figure 2
Factor Analysis on 16 Dimensions of Artist Judgement, Varimax Rotation



KEY

1. Expression of meaning
2. Representationalism
3. Silliness
4. Detail
5. Asymmetry
6. Planning evident
7. Novelty of the idea
8. Balance
9. Novel use of materials
10. Variation of shapes
11. Effort evident
12. Complexity
13. Neatness
14. Organization
15. Creativity
16. Technical goodness

the 16 artistic dimensions (ie. balance, complexity, etc.). For a particular dimension, then, there would be 13 judges by 91 collages, equalling 1,183 judgments. The scores for each judge for each of the eight experimental conditions (represented by 10, 11 or 12 subjects) were averaged, resulting in 13 judges by 8 conditions equalling 104 scores for each dimension. The single dimensions of creativity and technical goodness were analyzed using this 13 by 8 matrix, with judges as subjects.

The composite creativity dimension was composed of six dimensions which closely clustered on the varimax rotation (Figure 2). The 104 mean scores across these 6 dimensions were averaged, resulting in a 13 (judges) by 8 (conditions) matrix. For example, the mean scores for judge 1 on condition 1 of the six dimensions were averaged, the mean scores for judge 1 on condition 2 of the six dimensions were averaged, and so on. Graphically, a 13 (judges) by 8 (conditions) by 6 (dimensions) cube was collapsed along its dimension axis by averaging the corresponding scores of each dimension, resulting in a 13 by 8 matrix similar to the single dimension matrices.

The same technique was used to arrive at a 13 by 8 matrix for the technical goodness composite matrix, except that the scores were collapsed across five dimensions instead of the six for the creativity composite.

A one way analysis of variance with repeated measures (the Newman-Keuls procedure, Winer, 1971, pp 215-218) was

used to determine the significance of differences between pairs of means for the single creativity dimension. The same procedure was repeated for the composite creativity dimension, the single technical goodness dimension, and the composite technical goodness dimension.

In addition, for each case, the Scheffe test (Winer, 1971, pp 219-220) was used to determine significant differences between groups of means (ie comparing the means of the three no evaluation expectation groups with the means of the evaluation expectation groups).

Creativity

The primary focus of this study was the effect of evaluation expectation on creativity. It was hypothesized that the collages produced by subjects who did not expect evaluation would be judged higher on creativity than the collages produced by subjects who did expect evaluation. The exception to this pattern was the creativity behavior modification group, which had been given specific instructions on how to make collages which would be judged creative.

Creativity-single dimension

The results of the single dimension of creativity (Table 2) indicate that the only significant difference in means was between group 3 (creativity focus-no evaluation

Table 2
Creativity Ratings, Single Dimension Measure
Means on a 10 point scale and standard deviations

		Instructions Focus		
		None	Technical	Creativity
Evaluation Expectation	Absent	(1)* 3.538** 1.270***	(2) 3.776 1.459	(3) 3.404 1.134
	Present	(4) 3.423 1.363	(5) 3.263 1.542	(7) 4.762 1.489
	Present		(6) 3.180 1.515	(8) 3.885 1.213
			Specific Technical	Specific Creativity

* indicates condition number
** indicates group mean
*** indicates standard deviation

expectation) and group 7 (creativity focus-evaluation expectation). The mean of group 7 was significantly greater ($p<.01$) than the mean of its control. Both groups received identical instructions, except that group 7 was told its work would be evaluated. According to the overjustification hypothesis, the expectation of being evaluated should have resulted in less creative collages by group 7 than those of its control group.

Using the Sheffe test, the means of the no evaluation expectation groups 1,2,3 were compared to those of groups 4,5,6, and of groups 4,5,7. There were no significant differences among these groups.

Creativity-composite dimension

Table 3 shows the means for the composite creativity dimension. The mean of group 4 (no focus-evaluation expectation) was significantly lower ($p<.05$) than the mean of its control (group 1). The mean of group 5, the technical focus-evaluation expectation group, was significantly lower ($p<.05$) than the mean of its control, group 2. The mean of group 6, the technical behavior modification group, was significantly lower ($p<.01$) than its control.

As predicted, the mean of the creativity behavior modification group (8) which received specific instructions on how to produce judged creative collages was significantly greater ($p<.01$), than its control, group 3.

As in the case of the single creative dimension, the mean of group 7 was significantly greater ($p<.01$) than its control, group 3.

Using the Sheffe test, the no evaluation expectation groups 1,2,3 were compared to the evaluation expectation groups 4,5,6. As with the single creativity dimension, there were no significant differences.

Table 3
Creativity Ratings, Composite Measure
Means on a 10 point scale and standard deviations

Instructions Focus

Evaluation Expectation		None	Technical	Creativity
		(1)*	(2)	(3)
	Absent	4.305** 1.327***	4.341 1.387	3.588 1.111
	Present	(4) 3.914 1.331	(5) 3.868 1.286	(7) 4.521 1.303
			(6)	(8)
	Present		3.593 1.296	4.208 1.155
			Specific Technical	Specific Creativity

* indicates condition number
** indicates group mean
*** indicates standard deviation

Technical Goodness

Technical goodness, the degree of technical competence displayed by subjects in their work, was chosen as a feature which might be affected differently than creativity by motivational state. Creativity, as defined here, may depend upon the exploration of new ways to approach a problem. Technical goodness, however, may depend more upon the application of learned skills and a reliance on established

cognitive pathways.

The classroom motivational technique which is conducive to technical performance, such as emphasis on routine, may well stifle the creative potential of the individual by discouraging him from exploration.

Both creativity and technical skill seem to be major and yet distinct attributes of any creative product. By examining them together in the same experimental design it was hoped that some relationship might become apparent insofar as they are affected by motivational state.

Technical goodness-single dimension

Examining the single dimension of technical goodness (Table 4), no significant differences were found between no evaluation expectation and evaluation expectation pairs of means, except in the case of group 7, which mean was significantly greater ($p<.01$) than both its control (group 3), and the creativity behavior modification group (group 8).

The Sheffe test, comparing the no evaluation expectation groups 1,2,3 with the evaluation expectation groups 4,5,6,8, found no significant differences between these groups.

Table 4
Technical Goodness Ratings, Single Dimension Measure
Means on a 10 point scale and standard deviations

Evaluation Expectation	Instructions Focus: None	Technical	Creativity
Absent	(1)* 4.329** 0.974***	(2) 4.566 0.982	(3) 4.071 0.886
Present	(4) 4.006 1.000	(5) 4.763 0.920	(7) 4.937 1.160
		(6) 4.295 1.145	(8) 3.962 0.994
		Specific Technical	Specific Creativity

* indicates condition number
** indicates group mean
*** indicates standard deviation

Technical goodness-composite dimension

Similar to the results of the single dimension of technical goodness, no significant differences (Table 5) were found between the no evaluation expectation and evaluation expectation pairs of means except in the case of group 7, which mean was significantly greater ($p<.01$) than both its control (group 3), and the creativity behavior modification group (group 8).

Table 5
Technical Goodness Ratings, Composite Measure
Means on a 10 point scale and standard deviations

		Instructions Focus		
		None	Technical	Creativity
Evaluation Expectation	Absent	(1)* 4.082** 1.086***	(2) 4.330 1.185	(3) 4.107 1.153
	Present	(4) 3.918 1.172	(5) 4.670 1.388	(7) 5.239 1.222
	Present		(6) 4.386 1.431	(8) 3.701 0.958
			Specific Technical	Specific Creativity

* indicates condition number
** indicates group mean
*** indicates standard deviation

The Sheffe test, comparing the no evaluation expectation groups 1,2,3 with the evaluation expectation groups 4,5,6,8, found no significant differences between these groups.

Comparison of Instruction Groups

Although it did not involve the hypotheses of this study, it is of interest to compare the three instruction groups (no instructions, technical instructions, creativity instructions) for the cases of no evaluation expectation, evaluation expectation, and evaluation expectation-behavior modification.

For the single creativity dimension, in the case of the no evaluation expectation groups, there were no significant differences. In the case of the evaluation expectation groups, the mean of group 7 was significantly greater ($p<.01$) than either group 5 or group 4. There was no significant difference between the behavior modification groups.

For the creativity composite dimension (Table 3), in the case of the no evaluation expectation groups, the means of groups 1 and 2 were significantly greater than group 3 ($p<.01$). In the case of the evaluation expectation groups, the mean of group 7 was significantly greater ($p<.01$) than the means of group 4 and group 5. The mean of the creativity behavior modification group 8 was significantly greater ($p<.01$) than the technical behavior modification group 6.

For the single dimension of technical goodness (Table 4), there were no significant differences in the two cases of no evaluation expectation and evaluation expectation-behavior modification. In the case of the evaluation expectation groups, the means of groups 5 and 7

were significantly greater ($p<.01$) than group 4.

For the composite dimension of technical goodness (Table 5) there were no significant differences in the case of no evaluation expectation. In the case of evaluation expectation, the means of group 5 and 7 were both significantly greater ($p<.01$) than group 4. For the evaluation expectation-behavior modification groups, the mean of group 6 was significantly greater ($p<.01$) than group 8.

Intrinsic Interest

It was proposed earlier that subjects in the evaluation conditions should produce less creative products than no evaluation expectation subjects because their intrinsic interest had been undermined. In order to empirically link intrinsic interest to creativity, a questionnaire designed to measure the subjects' attitudes toward the collage making was administered after the activity was over. The compilation of these answers resulted in a 91 subjects by 5 questions matrix. A factor analysis was performed on this matrix; three of the five questions were found to correlate. The answers of question 1, which had a negative correlation with the other two questions 3 and 4, was reflected, and for each subject a mean was taken of the three scores. This mean score was intended to correlate with the subject's intrinsic interest: the higher the score, the greater the interest. A

one way analysis of variance was performed on the 91 subjects' scores according to the experimental condition they were in (Table 6). No significant differences were found between evaluation expectation and no evaluation expectation pairs of means.

Table 6
Intrinsic Interest

Instructions Focus

Evaluation Expectation	None	Technical	Creativity
Absent	(1)* 2.909	(2) 2.576	(3) 2.861
Present	(4) 3.000	(5) 2.694	(7) 3.364
Present		(6) 2.278	(8) 3.033
		Specific Technical	Specific Creativity

* indicates condition number

5. SUMMARY, DISCUSSION AND RECOMMENDATIONS

Summary

Results of the creativity composite dimension supported the main hypothesis of this study--that the expectation of external evaluation will lead to decrements in creativity. In the case of subjects who received specific instructions on how to make a creative collage and were expecting to be evaluated, there was an increment in the judged creativity of their collages. Considering that in this case subjects were following specific instructions it was argued that the task was, in fact, more algorithmic in nature. However, since the works of subjects acting under behavior modification instruction and those of subjects not expecting evaluation were expected to be rated high in creativity by artist judges, it was the intent of this study to examine a subject's intrinsic motivational state as an indicator of a creative state. It was hypothesized that subjects not expecting evaluation would not only produce artworks that would be judged significantly more creative (compared to those of subjects expecting evaluation), but that their self ratings on intrinsic interest would be significantly greater than evaluation expecation subjects.

The behavior modification subjects, although producing artworks judged high in creativity, were expected to rate themselves low on intrinsic interest because they were

expecting their work to be evaluated. Instead of immersing themselves in the task for the sake of the task itself, it was hypothesized that they would involve themselves in the task only to the extent necessary to satisfy the external criteria of evaluation expectation. The results of the intrinsic interest questionnaire were insignificant, however, and failed to support the hypothesis. No correlation was established between creative performance and intrinsic motivation.

The creativity focus-evaluation expectation group 7 unpredictably scored a significantly higher mean than its control (group 3) in both the creativity-single dimension and creativity-composite dimension cases. It also scored significantly higher means than its control in the technical goodness single dimension and technical goodness-composite dimension. In all four cases the mean of group 7 was the highest judged mean score of all eight experimental conditions. According to the hypothesis earlier mentioned in this study--that the imposition of extrinsic constraints would result in decrements in creativity--it was predicted that subjects expecting evaluation expectation would score lower on creativity than those not expecting evaluation.

In the two cases of technical goodness (single dimension and composite dimension), no significant differences were found between no evaluation expectation and evaluation expectation pairs of means, except for group 7, as mentioned previously. Although no predictions were made

for the technical goodness cases, it was expected that technical goodness as evidenced in the artworks would be affected differently than creativity by the imposition of the extrinsic constraint of evaluation expectation. In fact, this appeared to be the case. Although creativity was adversely affected by evaluation expectation, technical goodness remained unaffected.

In summary, evaluation expecation has a negative effect on creativity and no effect on technical competence as evidenced in works of art. The exception to this was in the case of subjects who were given instructions relevant to making creative artworks, and were told that their work would be evaluated. If the instructions include specific directions on how to make a collage which would be judged creative, then the subject would likely produce a collage judged high in creativity, despite evaluation expectation.

However, in accordance with the present thesis, if a creative performance depends upon some degree of risk taking and set breaking the imposition of salient extrinsic constraints establishing an extrinsic motivation will result in lower levels of creativity. The task must be one with some degree of ambiguity, having something less than an obvious solution or method of approach. In McGraw's (1978) terms, it must require a heuristic solution rather than an algorthmic solution. Clearly, this was not the case in the evaluation expectation-behavior modification studies cited earlier (Chapter 1), and was not the case in the behavior

modification groups included in this study.

If one directs a student to produce a quantity of unusual responses, and this is what the student does, then in no sense of the definition of creativity used here can the student's work be defined as creative. In the case of this study, the instructions given to the creativity behavior modification group apparently succeeded in reducing the ambiguity of the task. Since, as was evident from the factor analysis of the dimensions of judgement (Figure 2) judges considered complex, detailed designs involving novel use of materials to be creative, this group achieved high creative scores. What is crucial here is that, within the same experimental design, when subjects were given evaluation instructions but not told specifically what to do their creativity was dramatically lower (excepting group 7).

If the subject is given only a general instruction to make a creative collage, and is expecting to be evaluated on it (as in the case of group 7), he will produce an artwork judged high in creativity. No explanation can be offered to explain this unpredictable case.

On examining the differences between instruction groups little correlation was evident among the four cases (creativity-single dimension, creativity-composite dimension, technical goodness-single dimension, and technical goodness-composite dimension). In the creativity composite dimension (Table 3) the no evaluation-no focus group 1 scored significantly higher in judged creativity

than the no evaluation-creativity focus group 3, but the reverse was true in the evaluation expectation groups.

As would be expected, the behavior modification group which was given specific instructions on how to make a collage which would be judged high on creativity scored significantly higher means in creativity than the behavior modification group which was given specific instructions on how to make a technically good collage.

In the technical goodness single and composite dimensions (Tables 4 & 5) groups 5 and 7 both scored significantly higher means than group 4, however this pattern was not repeated across the no evaluation expectation groups 1,2,3. It was surprising to see the creativity focus group 7 score higher in judged technical goodness than the no focus group 4, considering how the creativity and technical dimensions grouped so clearly in the factor analysis (Figure 2). Predictably, the behavior modification group 6 which received specific instructions on how to make a collage judged high in technical goodness scored significantly higher in technical goodness than did the creativity behavior modification group 8 which was given specific instructions on how to make a creative collage.

Discussion

The results of the creativity-composite dimension support the hypothesis of this study, except for the creativity focus-evaluation expectation group 7. The resulting scores for this group throughout the experiment were unpredicted, and cannot be explained by any of the theories previously discussed. Intuitively, it seems illogical that subjects who are only told to produce a creative artwork should score higher means on creativity (though not significantly so) than those who were given specific directions on how to produce collages which would be judged high in creativity (given that both groups were expecting to be evaluated). It also seems unusual that this group should have significantly higher mean scores in judged technical goodness than either the creativity focus-no evaluation group 3, or the creativity behavior modification-evaluation expectation group 8.

The school in which this study was carried out does not stream its students, and the principal, when asked about the particular students in group 7, felt that they were a homogeneous and representative group.

Excepting group 7, there were no significant differences between pairs of means in the two technical goodness cases. It may be concluded that the imposition of the external constraint of evaluation expectation has no significant effect on the judged technical goodness of a subject's artwork. For classroom applications evaluation

expectation may be useful as a motivational method to induce subjects to complete problems requiring algorithmic solutions, but it will have no significant effect on the degree of technical goodness as evidenced in works of art.

Certainly evaluation expectation will have a negative effect on creativity in such works of art, so, unless the desired end result is to stifle students' creativity while at the same time having no effect on their technical competence, it would seem that evaluation expectation as a motivational technique is vagrant to the aims of education. Here, of course, it is necessary to define whether education should, as a socializing institution, focus on the indoctrination of the individual, or whether its role should be defined as assisting each individual to realize his or her full potential--in Maslow's terms, aiding each one to achieve self actualization.

The instrument used in this study to determine intrinsic interest appears to have been inadequate. After a factor analysis of the questionnaire answers only three items had high enough correlations to be used in the results. Three objective type questions answered on a five point scale does not seem to be a reliable measure of a cognitive state as complex as intrinsic interest. Considering the variations in conditions among the eight experimental groups some significant differences in intrinsic interest would intuitively be expected, and yet none were evident. The same instrument used in Amabile's

(1978) experiment resulted in only one significant difference between evaluation and no evaluation pairs of means.

The instrument used to determine degrees of both creativity and technical goodness--having subjects make collages and then having artist judges evaluate them--seems to work very well. There was a high interjudge correlation on each of the artistic dimensions, both in this study and Amabile's. This is remarkable, considering that each judge spent three to four hours alone in a small room viewing 91 collages, and made 1,456 seperate judgements spending approximately four seconds on each one. In addition, the judges were not trained in any way to agree with one another on their task. The factor analysis performed on these artist judgements also correlated very closely with Amabile's. The groupings on the varimax rotation were nearly identical.

Recommendations

It would be enlightening to have this study repeated, with certain changes. Certainly the intrinsic interest instrument used here was inadequate; perhaps a more elaborate measure could be devised and implemented in another study. It would also be useful if a behavior modification-no evaluation group could be included in a future study. Would this group score higher on judged creativity than the behavior modification-evaluation

expectation group?

.The creativity focus-evaluation expectation group 7 consistently scored the highest means in this study. In Amabile's study this experimental group scored predictable results--its mean on judged creativity was significantly less than its control. In the present experiment the differences between the means of group 7 and its control are both reversed and significant, but they cannot be explained. No conclusions have been drawn from these results due to their unpredictability. There is the need for a similar study to be done to see if group 7's mean correlates with the present study or Amabile's.

There is a growing body of literature and research which supports the hypothesis that various extrinsic constraints will have a deleterious effect on an individual's potential to be creative. This research usually determines an individual's creativity as manifested in a product. Certainly it is important to know the effects of environmental influences on creativity, and such knowledge contributes towards a better understanding of the subject, but what of the process itself? What goes on in the human mind that results in certain instances in works that society labels as creative? This study attempted a thrust in that direction by seeking to determine a correlation between intrinsic interest and creativity.

Certainly this experiment could be modified to examine more directly the creative process itself. For example,

consider using the collage making technique on an individual basis. A cine camera could be arranged above the work area and focused on the collage. Each time the subject makes a change to the collage an exposure would be made. By viewing the film from a projector the sequence of the collage assembly would become clear, just as one observes the petals of a flower opening in time lapse photography. Films of collages judged high in creativity could be compared in order to determine commonalities in the construction of creative collages. There are many possibilities on this theme, depending on available resources. The significance of the creative process surely deserves it more attention and investigation than it presently receives.

There has been a powerful trend in schooling to modularize learning, resulting in a steady decrease in the learning of specific skills in a context in which they are meaningful. When taken out of the context in which they are relevant, however, these skills lose their intrinsically motivating characteristics. Schools have placed heavy emphasis on the task intrinsic incentive of evaluation expectation as a technique to motivate students. This study has attempted to demonstrate the implications of evaluation expectation on creativity and technical goodness, and on an individual's intrinsically motivated state. Results do suggest that evaluation expectation has a deleterious effect on creativity as evidenced in works of art.

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