THE EFFECT OF MONETARY REWARD ON ARTISTIC CREATIVITY

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May, 1985

THE EFFECTS OF MATERIAL REWARD

ON ARTISTIC CREATIVITY

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Preface

This study was undertaken in an attempt to expand previous research on the effects of material rewards on performance. Specifically, the purpose of this study was to assess the effects of material rewards on artistic creativity. This study was designed, also, to test the validity of the reward induced developmental regression hypothesis in an attempt to provide an adequate theoretical explanation for the differential effects of rewards on performance.

Monetary rewards were found to have differential effects on artistic creativity and technical performance, on HIT variables associated with creativity, perceptual organization, and emotional disturbances affecting perception and fantasy. The enhancing and detrimental effects of rewards were found to be mediated by some important independent variables, such as the cognitive/emotional nature of the task, sex of subjects, training in art, and presence of artists in the family. An attempt is made in the present study, to explain the findings obtained within the notion of reward induced developmental regression.

This dissertion differs somewhat from the format called

for in the Oklahoma State University Thesis Writing Manual. The body of this dissertation consists of a complete manuscript prepared for publication entitled, "Effects of Monetary Rewards on Artistic Creativity," prepared according to the Publication Manual of the American Psychological Association, Third Edition. In order that the dissertation be complete by traditional standards, the Review of Literature section, which is usually presented in the body of the dissertation is presented in Appendix A. Also included as appendix materials are all supplemental materials (rating scales, questionnaire, etc,), raw data, and various statistical analyses.

I wish to express my sincere gratitude to all the people who assisted me in this work and during my stay at Oklahoma State University. In particular, I am especially indebted to my major adviser, Dr. John C. McCullers, for his invaluable guidance and help.

I am, also, thankful to the other committee members, Dr. Frances Stromberg, Dr. Marguerite Scruggs, and Dr. William Jaynes for their advice in the course of this work. Special thanks are due to Richard A. Bivins, Ellen M. Meissinger, B. J. Smith, Ronald Dubois, Nicholas W. Bormann, and Janice Pittsley for obtaining subjects and rating the subjects' art productions for this study and for earlier pilot work.

The help of Dr. Jon D. Swartz in scoring the HIT protocols is appreciated. I would like to thank, also, Dr.

Shu-ping Hodgson for her assistance in analysing the data and Dr. Mohsen Vafaie-Safti for his technical assistance in the use of the computer.

Special thanks are due to the College of Home Economics for the financial support received during the course of this work.

My parents, my husband Mohsen, my son Ali, deserve my deepest appreciation for their constant support, moral encouragement, and understanding.

This thesis is dedicated to my late father, Dr. Hector Aguilar Paredes and my mother Mrs. Lucrecia Merchan de Aguilar.

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This article is based on the doctoral dissertation research of the first author, conducted under the direction of the second author. Funds in support of the research were provided to the second author by the College of Home Economics, Oklahoma State University. The authors wish to thank Richard A. Bivins, Department Head, Ellen M. Meissinger, B.J. Smith, Ronald Dubois, Janice Pittsley and Nicholas W. Bormann, Professors in the the Art Department at Oklahoma State University for assistance and cooperation in obtaining subjects, and for rating the subjects' art productions for this study and earlier pilot work.

The authors also wish to thank Jon D. Swartz and Carol Swartz for their assistance in scoring the HIT protocols, and Shu-ping Hodgson for her assistance in analyzing the data.

Finally, the authors extend their appreciation to the

other doctoral committee members, Marguerite Scruggs, Frances Stromberg, and William Jaynes for their helpful comments on earlier drafts of this manuscript.

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Running Head: REWARDS AND ARTISTIC CREATIVITY

Abstract

This study was undertaken in an attempt to expand previous research on the effects of material rewards on performance. Specifically, the purpose of this study was to assess the effects of material rewards on artistic creativity. This study was designed also to test the validity of the reward induced developmental regression hypothesis in an attempt to provide an adequate theoretical explanation for the differential effects of rewards on performance. The population of the study consisted of 51 art students, enrolled in introductory courses of the Department of Art at Oklahoma State University. The subjects were asked to participate in an art activity, respond to a Questionnaire designed to measure motivational aspects of performance, and interpret inkblots, under reward and nonreward conditions. The major finding of this study refers to the differential effects of monetary rewards on tasks that require highly cognitive vs affective processes. Rewards enhanced creativity, as rated by art and design experts and increased scores on some HIT variables linked with affective mental functioning. Rewards on the other hand, had a detrimental effect on subjective ratings of craftsmanship or technical skill and decreased scores on some HIT variables associated with highly cognitive functioning. The authors attempt to explain the findings obtained within the notion of reward induced developmental regression.

Effects of Monetary Rewards on Artistic Creativity

The study of creativity has had a major emphasis in the past 30 years. Hundreds of research studies have explored creativity from different perspectives, as a cognitive, emotional/motivational and sociocultural phenomenon. Throughout the years, researchers have adopted different views of the nature of creativity; it has been defined both as an inherited capacity characteristic of a few geniuses and as a trait potentially present in every human being.

In light of the fact that creativity is regarded as a highly desirable trait in western culture, researchers have been concerned with the enhancement of creativity in young children as well as in adult individuals. As a result of a continued effort of several decades, researchers have reached a general concensus about the plasticity of creativity. Creativity has been found to be affected by a wide variety of environmental factors such as child rearing practices, educational methods, external reinforcement, evaluation and instructions, and by inducement of unusual states of consciousness through hypnosis or psychedelic drugs.

Among all these factors just mentioned, the effects of material rewards on human behavior have been the focal point of a great controversy. Traditionally, material rewards have been assumed to have only positive effects on human behavior either by enhancing intrinsic motivation or

improving performance. Recent findings have challenged this traditional view. In fact, evidence seems to indicate that external rewards cause detrimental effects on performance (Arnold, 1976; Fabes, McCullers, & Moran, 1981; Kruglanski, Friedman, & Zeevi, 1971; McGraw & McCullers, 1979; Moran, McCullers, & Fabes, 1984; McCullers, Fabes, & Moran, 1981; see McGraw, 1978 for a review), and decrease intrinsic motivation (deCharms, 1968; Deci, 1971; Lepper, Greene & Nisbett, 1973; Condry, 1977; see Lepper & Greene, 1978a for a review).

Alternative Explanations for the Detrimental Effect of Reward

Early theoretical accounts of the detrimental effects of material reward were based on cognitive and motivational processes (deCharms, 1968; Deci, 1975; Kruglanski, 1975; Lepper, Greene & Nisbett, 1973). For recent reviews on these theories see Bates (1979), deCharms and Muir (1978) and Lepper and Greene (1978a).

These theories have been found however to be incomplete or inadequate when extended to explain the detrimental effects of rewards on task performance (Lepper & Greene, 1978b).

Some researchers have suggested (Deci, 1975; Fabes, 1982; Feingold & Mahoney, 1975; Lepper & Greene, 1978b) that performance and motivation may be governed by different mechanisms. This assertion has received some empirical support from studies in which rewards decreased intrinsic

motivation but did not affect task performance (Deci, Cascio, & Krusell, 1975; Dollinger and Thelen, 1978; Ross, Karniol and Rothstein, 1976). It has also been found that rewards may have a detrimental effect on task performance but may not affect subsequent intrinsic motivation for performing that task again (McGraw and McCullers, 1979; McCullers, Fabes, & Moran, 1981; Harackiewicz, 1979).

Fabes et al., (1981) have postulated an alternative theoretical explanation to account for the detrimental effects of reward on task performance. They suggest that rewards may unconsciously affect cognitive functioning, perceptual organization and the general maturity level at which the subject approaches the task; thus, producing a temporary developmental regression.

Some initial support for this developmental regression hypothesis has been obtained with inkblots (Fabes, McCullers and Moran, In press), with tests of intelligence (Fabes et al., (1981); Moran et al., 1984), and with human figure drawings (McCullers et al., 1981).

The developmental regression hypothesis has been assessed mainly by using tasks that require highly cognitive processes. In the present study, the authors employed tasks that require mainly associative and affective functioning. The theoretical inspiration for wishing to explore these noncognitive factors in the study of the effects of rewards on task performance stems from the brain research of Paul MacLean.

MacLean (1970) has coined the term "triune brain," suggesting that the human brain is composed of three evolutionarily distinct structures. The oldest structure is the so-called "reptilian" brain, or reticular formation; the next oldest structure is the "paleomammalian" brain or limbic system and the most recent structure is the "neomammalian" brain or cerebral cortex.

In MacLean's triune brain model (1970; 1973), the center of emotional, affective behavior is the paleomammalian brain or limbic system which is an evolutionarily more primitive structure than the cerebral cortex. Based on MacLean's work, McCullers et al., (1979) have proposed that the offer of rewards to an individual may stimulate reward centers of the brain located in the limbic system. The activation of the limbic system in turn may cause an aroused emotional state that interferes with highly cognitive functioning.

In tasks that require highly cognitive functioning, the offering of reward should have a detrimental effect on performance. However, on tasks in which mainly affective processes are required, the offering of rewards may not be detrimental and may even be beneficial.

In the present study, rewards were offered to subjects performing an artistic activity. If regression is a prerequisite for successful performance in art, as suggested by several theorists (Freud, 1911/1958; Kris, 1952; Werner, 1957), then rewards may enhance artistic performance.

Artistic Creativity and Regression

A number of writers have suggested that artistic activity requires a primitivization of intellectual functioning. Ecker (1963) emphasized the noncognitive nature of an artistic experience; McKellar (1958) characterized artistic creativity as an activity requiring mainly loose associational thinking which is autistic in nature as opposed to logical thinking which is reality adjusted and more characteristic of the scientist. Finally, Lewin (1954) suggested that a heightened emotional state, which is so important for high quality artistic production, induces a primitivization (regression) in cognitive functioning.

Freud (1911/1958) originally proposed a shift in cognitive functioning from secondary to primary thought processes as a requirement for creative activity. Kris (1952) expanded Freud's ideas on artistic creativity and coined the term "regression in the service of the ego," to emphasize the nonpathological nature of the regressive processes required in a creative act.

Other grand scale theorists such as Werner (1957) also have used to the notion of regression to explain creative behavior. Werner believed that a creative person is able to use cognitive processes at different developmental levels, and to shift between primitive cognitive styles that are characterized by diffuse, unmodualated thinking and more mature cognitive styles in which integrative processes

predominate.

A great number of research studies have examined the relationship between creativity in the fine arts and regression (see Suler, 1980 for a recent review). These research findings provide substantial support for Werner's and Freud's conceptualizations of the creative act as a regressive process.

Of interest to the study of creativity within the context of developmental regression, are the significant and positive correlations obtained between objective tests of creativity, such as the Guilford tests (e.g., Guilford, 1971-76), and primary thought processes (Pine & Holt, 1960). Furthermore, associational abilities commonly measured in objective tests of creativity (Wallach & Kogan, 1965b), or the Remote Associates Test (RAT) (Mednick, 1962), do not seem to be related to cognitive abilities typically assessed through intelligence tests, indicating that associational ability may indeed be one of the many faculties related to creativity (Wallach & Kogan, 1965a).

Associative creativity, in turn, has been found to correlate significantly and positively with the tendency to engage in fantasy and imaginative mental activity, both of which are heavily influenced by primary thought processes (Wallach, 1970).

In light of the empirical evidence linking creative processes to primitive, drive oriented thinking, a brief

account of the effects of reward on processes related to artistic creativity is presented next.

Effects of Material Rewards on Cognitive and Motivational Processes Associated with Creativity

There exists abundant empirical evidence to suggest that material rewards enhance creativity, whether defined as associative novelty (Maltzman, Brooks, Bogartz, & Summers, 1958; Maltzman, 1960; Maltzman, Bogatz & Breger, 1960; Mednick, 1962; Maltzman, Belloni, & Fishbein, 1964), ideational fluency (Wallach & Kogan, 1965; Milgram & Feingold, 1977; Ward, Pankove & Kogan, 1972; Henson, 1975; Gallman, 1974), or divergent thinking abilities (Savoca, 1965; Johnson, 1974; Kandil, 1980; Bamber, 1974).

This enhancing effect has been found in a wide developmental span. Rewards have increased creativity in subjects of all ages, from preschool children (Rosen, 1980; Goetz & Baer, 1973; Ryan & Winston, 1978; Reynolds, 1974), to college students (Locurto & Walsh, 1976; McDonald & Martin, 1967; Maltzman, Simon, Raskin & Licht, 1958; 1960).

Rewards have also enhanced creativity in a wide variety of tasks, from simple activities like blockbuilding (Goetz & Baer, 1973; Reynolds, 1974) to more sophisticated behaviors like novelty in writing (Taylor & Hoedt, 1966; Maloney & Hopkins, 1973; Mitchell, 1971).

In recent years, a few research studies have attempted to isolate important independent variables such as race (Kandil, 1980), socioeconomic status (Johnson, 1974; Cox,

Nash & Ash, 1976), intellectual ability (Moran & Liou, 1982) perceived cognitive competence (Fabes et al., 1981) type of task (McGraw & McCullers, 1979; Daniel & Esser, 1980; Vafaie & McCullers, 1983) and external constraints (Amabile, 1977), that might mediate the effects of reward on performance.

Kruglanski et al.(1971) has shown contingent extrinsic reward significantly reduced verbal fluency in high school students.

Johnson (1974) found that the performance of disadvantaged children on the Torrance Test of Creative Thinking (TTCT) (Torrance, 1966-74) was significantly higher under reward conditions, while the performance of relatively advantaged children was slightly higher in the nonreward condition. Cox, Nash and Ash (1976) obtained similar findings with college students. Amabile (1977) demonstrated that external evaluation, as it is normally encountered in average school settings, decreased college students' artistic creativity.

McGraw and McCullers (1979) demonstrated that rewards have a detrimental effect on tasks requiring the breaking of a mental set. Reward subjects took longer to solve the set-breaking problem, and made significantly more errors than nonreward subjects.

Fabes et al. (1981) found that rewards affected primarily subjects low in perceived cognitive competence. These subjects completed fewer items, and attempted easier problems than subjects high in perceived cognitive

competence.

Moran and Liou (1982) have found that material rewards interact with the intellectual ability of the subjects. Rewarded subjects of high intellectual ability scored lower on three measures of creativity (fluency, flexibility, and originality), as measured by the circles task of the Torrance Tests of Creative Thinking (TTCT). Rewards on the other hand, facilitated performance on these three measures of creative talent in students of low intellectual ability. A similar trend was observed on another nonverbal task (the picture completion, also from the TTCT). Nonreward students scored higher on each of the four component scores, although the difference between nonreward and reward subjects was significant only on the flexibility measure.

In sum, there exists substantial evidence that material rewards enhance creativity, defined as divergent thinking production or as associational fluency. In recent years, however, it has been found that the effect of reward is not always positive, and that variables such as race, socioeconomic status, intellectual ability, perceived competence, external constraints, and task differences seem to mediate the detrimental effects of rewards.

Purpose of the Study

The study of artistic creativity within the context of the developmental regression has not been considered in past investigations.

The present study represents an exploratory attempt to

examine the effects of monetary rewards on artistic creativity and expand previous research within the context of the reward induced developmental regression, by utilizing tasks that require affective and emotional as well as cognitive processes.

This research examined creativity and technical skill in art, as judged by art and design experts. The subjects task was to prepare a collage, an art activity which has been tested in previous investigations (Amabile, 1977).

McCullers et al., (1979) suggested that material rewards may be detrimental to performance in tasks that require highly cognitive, logical functioning, such as tests of intelligence; but, may have an enhancing effect on tasks that involve emotional processes, such as artistic activity.

Another purpose of this study was to attempt to validate the developmental regression hypothesis as an alternative explanation for the detrimental effects of rewards, and to correlate performance on the Holtzman Inkblot Technique (HIT) (Holtzman, Thorpe, Swartz & Herron, 1961), with artistic creativity.

The HIT has been found to be related to intellectual, cognitive functioning and provides a means of evaluating cognitive processes. For a summary of previous studies of the correlation of HIT with several tests of intelligence, see Holtzman (1968).

The HIT is an standardized instrument, with adequate psychometric precision, and sensitive to developmental

differences in perceptual organization (Thorpe & Swartz, 1965; Thorpe & Swartz, 1966).

In addition, the HIT provides a measure of psychopathological thinking. Bizarre emotional states have been found to be inversely related to high conceptual differentiation (Holtzman, 1968), but positively related to creative potential (Richter and Winters, 1966) and divergent thinking ability (Clark, Veldman & Thorpe, 1965).

Finally, some other HIT variables, besides Pathognomic Verbalization, like Movement, Color and Location, have been linked with creative productivity, and artistic creativity.

In sum, the HIT offers a unique vehicle not only for assessing developmental differences, but also for estimating creative potential.

Method

Subjects

A total of 60 subjects began the study but for various reasons 9 students did not complete the entire experiment and had to be eliminated from the sample. The final sample of 51 subjects consisted of undergraduate students, including freshman, sophomore, junior and senior students.

The subjects were predominantly white, middle-class students, and there were more females than males (14 males and 37 females).

The students were selected from four introductory art classes from Oklahoma State University. The mean age of these students was 19.5 years with a range from 18 to 21

years. There were only three subjects who were much older than the rest of the subjects, 26, 29, and 35 years of age.

Design

The research design consisted of a multiple factor, repeated measures design. (The experimental design is diagrammed in Appendix D). Four intact art classes were assigned randomly to one of four treatment groups, that differed with respect to whether or not rewards were administered and the sequence of administration.

The experiment was conducted in two separate sessions, Session II occuring approximately a week after Session I for all four treatment groups. Each session in turn, consisted of two phases each immediately following the other in sequence. Phase 1 was used to collect subjective and objective measures of artistic performance. Ancilliary data were also collected in Phase 1 on task interest, task enjoyment and perceived task compentency and difficulty. Phase 2 was designed to obtain measures of perceptual organization.

In Session I, the art activity and questionnaire were administered under nonreward conditions in all treatment groups. However, the HIT was administered such that treatment groups 2 and 4 received reward, while treatment groups 1 and 3 did not. In Session II, groups 3 and 4 were offered reward for participating in the art activity and the HIT, while groups 1 and 2 were not. At the end of Session II, the number of times each treatment group had received

reward varied such that: Group 1 was the control group and did not receive rewards throughout the experiment. Group 2 was rewarded only once for responding to the HIT in Session I. Group 3 was rewarded twice in Session II for participating in both the art activity and the HIT. Group 4 received reward three time: (1) in Session I for taking the HIT, (2) in Session II for the art activity, and (3) in Session II for taking the HIT. The different reward sequences among conditions was planned to test the possibility of a cummulative reward effect.

Each subject produced one artwork per session, yielding a total of 102 artworks in both sessions as follows: 12 from Group 1, 11 from Group 2, 19 artworks from Group 3, and 9 artworks from Group 4. Fifty-four subjects took the HIT in each session.

Materials and Procedure

Four college professors collected artistic performance and questionnaire data. HIT data were collected by the first author, a female graduate student experienced in testing and working with college students.

The artistic performance measures were obtained in the regular art studios, the students were asked to make a collage. This task was developed by Amabile (1977) and does not require special skills or training in art. Questionnaire measures were obtained immediately after engagement in the art activity, by means of a group administered instrument developed specially for this study.

After the questionnaires were answered by the students, the Holtzman Inkblot Technique (HIT) was group administered, to each treatment group (1, 2, 3, and 4), separately.

Artistic Performance

In order to obtain products for assessment, the subjects were asked to make a collage type artwork in Sessions I and II. Session I provided baseline measures of artistic creativity and technical proficiency. Session II was designed to assess the effects of reward vs nonreward on these same dimensions of artistic creativity and technical proficiency.

In both Sessions the subjects were supplied with identical sets of materials: a prearranged package of 120 pieces of construction paper of different sizes, shapes and colors (50 circles in 5 different sizes, 10 colors of each size; 20 squares, 10 triangles, 10 long strips, 10 short strips, 10 arches, and 10 cone shapes, all in 10 different colors), a small bottle of Elmer's glue and a 14 x 18" sheet of white paper.

Procedure

To help ensure that the subjects would take the task seriously, the instructors of each class collected the data. The experimenter met with the instructor just prior to the beginning of a session, and provided the necessary materials: (1) materials to make the collage; (2) the instructions to be read to the students; and, (3) as appropriate, the reward money.

Session I: Baseline Measures. The students were given the following standard instructions:

> This is part of an ongoing project to study artistic attitudes, feelings and perceptions. We are going to do several things today. The first thing will be to prepare a collage. These are the materials you will use for the activity. You'll be using these colored pieces of paper to make a design on your papers. You can use whatever pieces you want, however many of them you'd like, and glue them on your paper in any way that you wish. There are two things for you to keep in mind: first, please don't use any materials other than what we have laid out here for you. So if you have a pencil or pen, don't use it. Second, we would like you to make a design which conveys a feeling of silliness, like when you are "feeling silly" or "acting silly". So, try as much as possible to make your design express a feeling of silliness.

In order to avoid conveying the idea that the artworks were going to be evaluated in any way, the instructions continued:

> After you finish the design, you will be asked to fill out a questionnaire. We are not interested in the collage itself, or how you go about putting it together. However, please take the task seriously because we are interested in how the task affects your response to the questionnaire that follows. Work independently and do not talk to your classmates. Time is not a factor but try to do the best you can in the time available. I will ask you to stop working at _____. To keep your work anonymous, and assure you that you are not identified with it, I am going to ask you to draw a random number and use that number to identify your work and questionnaire. Keep this number with you and write it down somewhere in your materials or book that you normally bring to class.
>
> Although your work will not be graded or count in any way toward your grade, try to use the problem as an opportunity to display your technical skill and creativity. Any questions?

To conclude the instructions, the instructor added:

> For your information, so that these artworks do not go to waste, they are going to be donated to different nurseries in Stillwater, to serve as wall decorations.

Session II: Experimental Measures. The data were collected in the same way as in Session I.

The standard instructions during Session II differed only with respect to the offering of the reward. The students knew ahead of time whether or not they were going to receive a reward. The reward subjects were told:

> To help you display your technical skill and creativity, this time, I am going to pay you five dollars in cash upon completion of the collage activity and questionnaire.

To make sure that the students believed the instructions, the instructors had the money in a bag easily seen by the students. The reward offered was 5 one-dollar coins for each student. To prevent subjects entering this session (II) expecting a reward for their participation, all nonreward subjects (for the art activity and the HIT) were scheduled before the reward subjects. Nonreward subjects were chosen from two classes (conditions 1 and 2), and the reward subjects from other two classes (conditions 3 and 4).

Subjective Ratings

Judges. Four college professors from Oklahoma State University, three males and one female, served as judges of the artworks. Two of the judges were Professors in the Art Department, and two were Professors in the Department of Housing, Design and Consumer Resources.

All of them had extensive training in art (design,

drawing, ceramics, painting, scupture, etc.) and with the exception of one judge all have served as judges prior to this study in a variety of juried competitions such as Arts and Crafts shows, posters and displays, Architectural designs, etc.

Procedure. The Four judges were asked to evaluate the 102 artworks. The artworks were displayed as 51 pairs in a large exhibit area. By displaying all the artworks at one time, the judges could readily compare them. Each pair was randomly assigned a number (1 to 51) for identification purposes. Thus, each pair of artworks had a small label between them with an identification number, and each artwork had similar label with the letters A or B. The artworks at the left hand side were always labeled with the letter A and those at the right were always labeled as B. The two artworks within a pair were produced by the same subject, and were made during Sessions I and II. For judging purposes, the labels were counterbalanced such that half of the artworks made in a single session (I or II) were labeled "A" and half were labeled "B".

The judges viewed the artworks individually for an average time of 3.5 hours, the amount of time spent by the judges in viewing the designs ranged from three to five hours.

Before each judge began to score the artworks, the experimenter spent several minutes introducing the judge to the task. Each judge was given a handout (a copy of this

handout is presented in Appendix E), which contained background information on the study (who the subjects were, how the materials were provided for the activity, and the instructions given to the students), a set of instructions for the judges, the criteria for Creativity and Craftsmanship (technical skill) and the evaluation sheets to be used for the actual scoring.

The instructions to the judges were: (1) to inspect all designs, (2) to inspect the designs of a given pair, and then make judgments, (3) to examine the evaluation form and determine if the instructions were clear (an example on how to score was included), (4) to make sure that the design identification number on the board matched the number on the evaluation form, and finally (5) to evaluate the judgment dimensions independently of one another, as much as possible, and try to avoid ties.

The criteria to be considered for evaluation of the artworks were also discussed with the judges before the judgment began. The judges were asked to make judgments on five dimensions: Creativity, Craftsmanship, Aesthetic Value, Maturity and Overall Rating. All of these dimensions, except Maturity, are typically considered in judging an art contest. Maturity was included because of its importance to the specific research question of this study concerning developmental regression. The dimensions of Creativity and Craftsmanship as well as the factors associated with them (presented below) were adopted from

Amabile (1977). Amabile (1977) developed a simple subjective method for assessing Creativity and Craftsmanship in which purely subjective factors were included along with objective factors associated with these dimensions. The factors identified as being associated with Creativity were: Novel idea, Novel use of materials, Effort evident, Variation of shapes, Detail and complexity. The factors associated with Craftsmanship were: Overall organization, Neatness, Planning evident, and Expression of meaning. A list of these factors with their descriptions is provided in Appendix E.

There were 51 evaluation sheets attached to the handouts for each judge. Each sheet contained five rating scales, one for each of the five dimensions: Creativity, Craftsmanship, Aesthetic Value, Maturity and Overall Rating. The rating scale consisted of a 40-point continuous scale with five equally spaced reference points marked, three of which were labelled ("low", "medium" and "high"). A copy of the evaluation form is included in Appendix F.

Following the initial introduction and presentation of the evaluation materials, the judges were alone during the evaluation of the art works.

Objective Ratings

In addition to the subjective evaluations obtained from the judges, several objective measures were taken on each design: (1) number of pieces used, (2) number of colors used, (3) number of global shape categories used (such as

circle, rectangle, etc.), (4) number of individual shape categories used (such as large circle, rectangle, etc), (5) number of pieces altered in some way (ripped, folded, crinkled, etc.), (7) number of pieces made three dimensional sional, and (8) percentage of area covered by design. These objective measures were collected in the present study because of the significant correlations found in Amabile's study (1977) between these measures and Creativity ratings.

Questionnaire Self-Reports

Session I: Baseline Measures. Immediately after the subjects completed the art activity, they were asked to respond to a questionnaire composed of 12 items, designed to assess task interest, task enjoyment, and perceived task competency and difficulty, and a Personal Information Sheet used to obtain demographic information on the subjects, and information as to the kind and amount of art training they had had, and whether any relatives (mother, father, uncle, grandparent, sister, etc.) were artists or had artistic talent.

The questionnaire was prepared such that the subjects could respond in terms of a seven-point Likert scale.

Task interest was measured by two questions: (1) "Did you view your engagement in this activity as motivated by intrinsic factors, like your own interest, or by extrinsic factors, like the instructor's instructions?" and (2) "How likely you would be to volunteer for a similar project in the future?."

Task enjoyment was assessed by six questions: (1) "How much do you enjoy painting and related art work?," (2) "How much you do like your finished design?," (3) "Was the art activity more like work or more like leisuire activity?," (4) "How enjoyable did you find this task?," (5) "How stressed did you feel during the session?," and (6) "How playful did you feel during the activity session?."

Perceived task competency was assessed through three items: (1) Rate your ability on painting, drawing and design, (2) Rate your ability on this task, and (3) "How satisfied were you with your performance in the art activity?."

Finally, perceived task difficulty was measured by one question: "How easy was the design problem for you?."

Session II: Experimental Measures. Approximately a week after Session I, the art activity and questionnaire were administered again. The questionnaire was the same as in Session II as in Session I, except that for those subjects who received reward during the art activity (Groups 3 and 4), one more item (13) was added, ("How much did you like the reward you got?"). (Refer to Appendix F for copies of the questionnaires administered in Sessions I and II).

The Holtzman Inkblot Technique

Procedure

Another component of this investigation was the assessment of perceptual organization and maturity by means of the Holtzman Inkblot Technique (HIT), group administered form (Swartz & Holtzman, 1963).

Session I: Reward offered for the first time. During Session I, Form A of the HIT was group-administered separately to each treatment groups.

Instructions to the subjects, data collection, and scoring followed standard procedures (Holtzman, 1961). The instructions for the reward groups differed from the standard instructions only with respect to the offering of the reward. After completing the standard instructions, the experimenter told the reward subjects:

> To encourage you to be as imaginative as possible I have funds from Oklahoma State University to pay you $5.00 in cash upon completion of the activity.

To insure the credibility of the experimenter's words the money was carried in a bag which could be easily seen by the subjects.

Session II: Reward offered for the second and third time. During Session II, Form B of the HIT was used. As in Session I, two groups received rewards and two did not; but in Session II, treatment groups 3 and 4 received rewards, while treatment groups 1 and 2 did not.

Results

All data were analyzed via the Statistical Package for the Social Sciences (SPSS) Computer Program (Nie, Hull, Jenkins, Steinbrenner & Bent, 1975).

The results are presented generally in the same sequence as that of the experimental design. That is, Session I results are presented before Session II results, and within sessions the subjective and objective ratings of artistic performance will be presented first, followed by the Questionnaire data, and then the Holtzman Inkblot Technique (HIT) results.

General analyses, that included all the subjects were performed first, and where preliminary analyses yielded significant differences due to sex, art training and artists in the family, the data were further analyzed.

Artistic Performance

Reliability of Judges Ratings

Spearman-Brown interjudge reliability coefficients were calculated for ratings on each of the 5 different artistic dimensions: Creativity, Craftsmanship, Aesthetic Value, Maturity, and Overall Rating (See Table I, Appendix B). In general, the reliabilities calculated in this manner were significant but moderately low for 4 of the 5 dimensions, reliabilities were above .50, and the median reliability was .52 . Of particular interest is the reliability coefficient of .53 for the major dependent measure of Creativity.

Method of Analysis

The scores for the analyses of performance were obtained by calculating individual judge scores and average judge scores in each of the 4 experimental conditions (an average of these ratings for each condition). For example, an average "creativity score" was obtained for each judge and each experimental condition, by summing the judge's ratings for that group, and dividing by the number of artworks in the group. This would yield, for each one of the artistic dimensions, 204 scores, from 4 judges and 51 subjects.

Average judge ratings were computed by adding individual average judge scores (from 4 judges) on each dimension for each of the 4 conditions, and dividing it by 4. This would yield 51 scores, for each one of the artistic dimensions, in each condition.

Subjective Ratings

Session I Measures: Judges' Ratings of Artworks. Session I mean judges' rating scores and their standard deviations for all five dimensions are presented in Appendix B (Table II) for each reward condition.

All four judges ranked Group 4 highest on Creativity, Maturity and Overall Rating. Similarly, three judges ranked Group 2 highest on Craftsmanship. At the other extreme were Groups 1 and 3. These groups received the lowest ratings by most judges on most variables. Three of the four judges rated Group 1 lowest on Craftsmanship and Aesthetic Value,

and two judges gave this group lowest scores on Creativity, Maturity and Overall Rating.

While subjects in Groups 4 and 2 (in this order) produced artworks of moderately better quality than those made by subjects in Groups 1 and 3, it appears that during Session I, before the introduction of rewards, differences among groups (1, 2, 3 and 4) generally were not significant for most judges on most dimensions.

A one way analysis of variance utilizing average judge scores did not reveal significant differences among conditions on Session I (See ANOVA Tables in Appendix I).

Further planned comparison tests utilizing average judge scores also did not yield significant results due to sex of subject, past art training or artists in the family on any of the five artistic dimensions.

Planned comparison tests utilizing individual judge scores, however yielded significant differences due to sex of subject and art training for two judges. One judge rated females significantly higher than males on Creativity, t (49) = 2.77, p = < .008). Another judge rated subjects with prior art training significantly higher than those without such training, on Creativity, t (49) = 2.11, p = < 04), Craftsmanship, t (49) = 2.02, p = < .04) and Aesthetic Value, t (49) = 2.07, p = < 04.

Session II Measures: Judges Ratings of Artworks. Session II mean judges' rating scores and their standard deviations are presented for each reward condition in

Appendix B (Table III).

Mean values from these average judge scores reveal a definite pattern. Reward groups obtained higher scores than non-reward groups on Creativity, Aesthetic Value, Maturity and Overall Rating, while non-reward groups obtained higher scores than reward groups on Craftsmanship (See Figure 1. Appendix c).

However, a 2 x 2 (Reward x Sex) analysis of variance considering average judge ratings on Session II yielded nonsignificant findings due to reward, sex or an interaction of both factors.

Individual judge scores revealed that three of four judges rated the reward subjecs higher than nonreward subjects on Creativity, Aesthetic Value, Maturity, and Overall Rating. However, a 2 x 2 (Reward vs Nonreward x Sexes) analysis of variance utilizing individual judge scores revealed only a significant Reward main effect for one judge on Overall Rating, F (1,50) = 3.80, p = < .05.

No significant Sex main effects or Reward x Sex interactions were obtained from these individual judge analyses.

Difference Scores. In order to analyze the effects of reward in relation to baseline performance, a 2 x 2 (Reward x Sex) analysis of variance utilizing average judge scores was performed revealing nonsignificant effects.

Results from analyses with individual judge scores did reveal however, a significant Reward main effect was

obtained from one judge on Creativity, F (1,50) = 8.85, p = < .05. Reward subjects obtained higher scores under reward (Session II) than nonreward conditions (Session I). Nonreward subjects on the other hand performed better in Session I. A similar trend, although nonsignificant, was observed for the other judges on Aesthetic Value, Maturity and Overall Rating.

Utilizing individual judge difference scores, a Reward x Sex interaction reached significance on Craftsmanship, F (1,50) = 3.78, p = < .05, and a Reward x Artists in the Family interaction approached significance also on Craftsmanship, F (1,50) = 3.64, p = < .06. In general, rewards decreased scores on technical skill for all subjects; however, the detrimental effect of rewards was more pronounced in male subjects and in subjects with artistic talent present in the family (See Figures 2 and 3, located in Appendix C).

Objective Ratings

Session I Measures. Objective rating scores and their standard deviations for all objective measures are presented for each reward condition (See Table IV, Appendix B).

Preliminary planned comparison tests revealed significant differences due to sex of subject and previous training in art. Female subjects obtained higher ratings than male subjects on all objective dimensions except on number of pieces made three-dimensional.

Session II Measures. Session II objective rating

scores and their standard deviations for all objective measures are presented for each condition in Table V, Appendix B.

A 2 Reward x 2 Sex analysis of variance on Session II ratings failed to reveal any significant Reward, Sex or Reward x Sex interactions.

Significant interactions between reward and art training and reward and artists in the family were obtained however, on several objective dimensions. Figures 3 to 8, located in Appendix C, depict the differential effects of reward on objective ratings as mediated by previous training in art and artistic family background (See ANOVA Tables in Appendex I).

Objective Ratings and Subjective Ratings

In order to examine the relationshp between objective features of the designs and judges' subjective ratings of Creativity and Craftsmanship, Pearson product-moment correlations were computed between these two measures.

Moderately low but significant correlations were obtained. Pearson correlations between objective ratings and subjective ratings of Creativity and Craftsmanship are presented in Table VI, Appendix B. In general the correlations were significant and positive with ratings of Creativity but nonsignificant and negative with ratings of Craftsmanship, except on percentage of area covered. This objective dimension correlated positively and significantly with Creativity and Craftsmanship ratings.

Questionnare Measures

In order to examine motivational characteristics of reward and nonreward subjects, which might correspond to differences in artistic creativity and craftsmanship, a written assessment of the art activity was required from all subjects immediately after the completion of the designs.

Session I Measures

Questionnare self-report ratings for Session I are presented in Table VII, Appendix B, for each condition.

Preliminary one-way analyses of variance on the questionnaire data revealed no significant differences among conditions on any of the items, indicating that the four experimental groups did not differ in terms of task interest, task enjoyment and perceived task competence and task difficulty.

Session II Measures

Session II questionnaire self-report ratings are presented in Table VIII for each reward condition.

During Session II, highly significant differences in motivational states were found between subjects who performed under reward and nonreward conditions.

A planned comparison analysis between reward and non-reward subjects revealed significant findings on several items. Reward subjects perceived their engagement in the art activity as motivated by intrinsic factors (item 3), while nonreward subjects viewed their engagement in the activity as motivated by extrinsic factors, t (51) = 2.64,

$p = < .01$.

Differences in task enjoyment were also found. During Session II, reward subjects felt significantly more playful (item 5) than nonreward subjects, t (51) = 3.13, $p = < .003$.

Rewards also produced significant differences in the subjects' perceptions of difficulty level of the art activity. Reward subjects perceived the art activity as very easy (item 8), while non-reward subjects perceived it as some what more difficult, t (51) = 2.41, $p = < .02$.

Reward subjects were significantly more willing to volunteer (item 12), for a similar experiment than nonreward subjects, t (51) = 3.30, $p = < .004$. Finally, reward subjects liked very much the 5.00 dollar reward offered for participating in the art activity, as demonstrated by the mean value (mean of 6.2/7.0) of reward subjects on item 13.

The Holtzman Inkblot Technique

A list of the HIT variables and theoretical score range is presented in Table IX, Appendix B.

Results pertaining HIT data will include analyses of individual HIT variables as well as analyses of clusters of variables considering perceptual organization (Factor I), emotional responsiveness (Factor II), emotional disturbance (Factor III), Creativity Composite (CC) and Developmental Composite (DC) scores. Individual HIT variables associated with each factor or composite score are also identified in Table IX. Two highly experienced scorers rated the HIT protocols obtained in the present study.

Session I: Rewards offered for the First Time

Session I mean HIT scores, and their standard deviations for all individual HIT variables are presented for each reward condition in Table X, Appendix B.

A 2 x 2 x 2 x 2 (Reward x Sex x Art Training x Artists in Family) analysis of variance revealed significant differences for Reward and Art Training main effects, two-way (Reward x Sex) and three-way (Reward x Art Training x Artists in the Family) interactions. Sex and Artists in the Family main effects were nonsignificant.

Reward groups obtained higher scores than nonreward groups on M, F (1,53) = 12.68, p = < .001, H, F (1,53) = 4.8, p = < .03, and PV, F (1,53) = 12.67, p = < .001.

Session I mean HIT composite scores, and their standard deviations, are presented in Table XI, Appendix B, for each condition.

Reward subjects obtained significantly higher scores on perceptual organization and maturity, Factor I (M, I, H, FD, and P), F (1,53) = 8.75, p = < .005, Significant reward/nonreward differences were also obtained in emotional disturbances and psychopathological thinking, Factor III (PV, Ax, Hs, and M), F (1,53) = 9.39, p = < .004. Session I reward/nonreward differences on Factors I and III are illustrated in Figures 9 and 11, respectively, in Appendix C.

Reward subjects obtained nonsignificantly higher CC score than nonreward subjects, F (1,53) = 3.16, p = < .08,

and DC score, F (1,53) = 2.02, p = < .16. Figure 13 depicts differences between reward and nonreward conditions in Session I, on CC scores (See Appendix C).

Significant Reward x Sex interactions were obtained on several variables: FA, F (1,53) = 5.7, p = < .02, Ax, F (1,53) = 4.21, p = < .04, Hs, F (1,53) = 13.01, p = < .001, CC score, F (1,53) = 5.60, p = < .02, and Factor III, F (1,53) = 9.6, p = < .003. A pronounced enhancing and detrimental effect was observed mainly in male subjects. Rewarded male subjects obtained significantly higher scores than nonrewarded male subjects on every variable, except in FA. The performance of female subjects on these variables was not altered significantly with the introduction of rewards. Rewarded and nonrewarded female subjects obtained equal scores on Ax and Hs, however rewarded females obtained nonsignificantly higher scores than nonrewarded females in FA, Factor III, and CC score.

Reward was also found to interact with Art Training in Br, F (1,53) = 3.83, p = < .05. Rewards increased Br scores only in subjects with previous training in art. Barrier loads positively and high on Factor I, thus higher Br scores are desirable and are indicative of higher ego differentiation .

No significant Reward x Artists in the Family interactions were obtained.

A significant Sex x Artists in the Family interaction was obtained on Sx, F (1,53) = 4.27, p = < .04. Male

subjects who had artists in their families obtained the highest scores, while female subjects with artists in their families obtained the lowest scores. Male and female subjects without artists in the family obtained similar scores. HIT responses that make reference to sex are associated with primary thought process and with creativity. The present results give evidence that primary process thinking was most evident in male subjects who have close relatives with recognized artistic talent.

Reward interacted with Art Training and Artists in the Family on the following variables: FD, $\underline{F}$ (1,53) = 4.44, $\underline{p}$ = < .04; P, $\underline{F}$ (1,53) = 3.88, $\underline{p}$ = < .05; and Factor I, $\underline{F}$ (1,53) = 4.35, $\underline{p}$ = < .04. Rewards increased FD and Factor I scores the most when subjects had had previous training in art but no artists in the family. Finally, rewards enhanced P responses in two instances. One, in subjects who neither had previous art training nor artists in the family; and two, in subjects who had both factors, previous training in art and artists in the family.

Reward x Sex x Art Training interactions reached significance on CC score, $\underline{F}$ (1,53) = 5.05, $\underline{p}$ = < .03, and approached significance on L, $\underline{F}$ (1,53) = 3.31, $\underline{p}$ = < .07. Rewards increased CC Scores and L responses (lower L scores) mainly in male subjects with previous training in art.

Another set of three-way interactions (Sex, Art Training and Artists in the Family) yielded significant results: FD, $\underline{F}$ (1,53) = 6.8, $\underline{p}$ = < .01, Factor I,

F (1,53) = 6.37, p = < .01. and Factor II, F (1,53) = 5.33, p = < .02. Highest FD scores were obtained from female subjects who either had artists in the family or previous training in art. Male subjects who had artists in the family and previous training in art obtained higher scores than other male subjects who had previous training in art but no artists in the family. Highest Factor I scores were obtained from female subjects with previous training in art but with no artists in the family. Male subjects who either had artists in the family or previous training in art obtained highest Factor II scores.

Since the overall analysis of variance on Session I data yielded significant Art Training main effects, separate planned comparison tests were computed in order to evaluate the effects of reward on subjects with previous training in art as opposed to the effects of reward on subjects without such training.

Separate analyses that included only subjects with past art training yielded significant findings on the same variables and Factors as those reported earlier for the general population of this study.

Contrary to the numerous effects of rewards obtained with subjects with past art training, very few significant findings were obtained from the paired comparison test of subjects with no past training in art. The effects of reward seem to be more pronounced in subjects who have developed certain level of skill.

Separate t tests performed on males and females, and on subject with and without artists in the family, suggested that the effects of reward were most pronounced in males (See Table XV, Appendix B), and in subjects with artists in the family.

Pathognomic Verbalization. High PV responses are indicative of emotional disturbances affecting fantasy and perception. Generally, it is assumed that, the higher the PV score is, the higher the degree of emotional disturbance will be. However, Swartz (1969) has observed that moderately high scores on some PV categories, like Fabulation (FB), Fabulized Combination (FC), and Queer Response (QR), are characteristic of normal college populations, however; some other responses, like Autistic Logic (AL) and Self Reference (SR) are not.

Since in the present study, rewards significantly increased PV scores, the nature of this increment was considered to have important implications in the study of the effects of rewards on HIT performance.

A separate 2 x 2 x 2 x 2 (Reward x Sex x Art Training x Artists in the Family) analysis of variance was performed on Session I data, to assess the effects of reward on the incidence of several types of PV responses.

A significant Reward main effect was revealed on two types of PV responses: Queer Responses (QR), F (1,53) = 4.09, p = < .05, and Fabulized Combination (FC), F (1,53) = 6.92, p = < .01. Rewards increased significantly the

incidence of these two types of responses.

Significant reward x sex interactions were found on Autistic Logic (AL), F (1,53) = 5.95, p p = < .01, and in the production of QR responses, F (1,53) = 3.60, p = < .06. In general, rewards increased the incidence of AL and QR responses in all subjects. However, the greatest numbers of AL and QR responses were given by rewarded males, and the least were given by nonrewarded males. Scores of rewarded and nonrewarded females fell in between these two extremes, with no pronounced differences between them.

Rewards were also found to interact with Artists in the Family in the production on Fabulation (FB) responses, F (1,53) = 4.58, p = < .02. Rewards increased FB responses only in subjects who had artists in the family; however, when subjects did not have this family background, rewards did not have any effect, and scores were quite low. Nonreward subjects with no artists in the family obtained higher scores than reward subjects with no artists in the family.

A Reward x Sex x Art Training interaction approaching significance was obtained on AL responses. Reward increased AL responses only on male subjects who had previous training in art. Rewards on the other hand produced similar levels of performance in female subjects regardless of previous training in art.

Session II: Rewards offered for the second and third times

Session II mean HIT scores and their standard

deviations are presented in Table XII, in Appendix B. In contrast to the numerous significant results obtained in Session I, Session II analyses failed to reveal significant differences on targeted variables.

Session II mean HIT composite scores and their standard deviations for each reward condition are presented in Table XIII, Appendix B. A pattern of nonsignificant results was obtained with composite scores, similar to the pattern observed with individual HIT variables.

A 2 x 2 x 2 (Reward x Sex x Artist in the Family) yielded a Reward main effect approaching significance on Factor I, F (1,53) = 3.14, p = < .08. Reward subjects obtained higher scores than non-reward subjects.

No other significant main effects were found on Factor I, Factor II, Factor III, the CC Score or the DC Score. Session II differences between reward and nonreward are depicted in Figures 10, 12 and 14, located in Appendix C.

Significant Reward x Art Training and Reward x Sex x Art Training interactions were obtained in two variables that have been found to correlate with creative ability. One such variable is Location: Rewards had a detrimental effect (increased L scores) in subjects who had not had previous training in art, F (1,53) = 2.74, p = < .10. Furthermore, when these subjects without past art training, were males, rewards increased L scores even more, F (1,53) = 5.51, p = < .02. The sex of subjects and the level of technical skill are then two factors that seemed to mediate

the detrimental effects of reward on HIT Location scores.

Another variable influencing performance on HIT L scores was Artists in the Family. A significant Reward x Art Training x Artists in the Family interaction was obtained on L, $\underline{F}$ (1,53) = 14.17, $\underline{p}$ p = < .001. The lowest scores (more desirable scores) were obtained from subjects who received rewards, had past training in art and had artists in the family. The poorest (highest) L scores were obtained when rewards were offered to subjects who did not have previous training or artists in the family. This finding is relevant due to the fact that production of whole responses (lowest L scores) has been suggested to be important variable indicating artistic creativity.

Abstract is another HIT variable that is significantly and positively correlated with artistic creative ability. Significant Reward x Art Training, Reward x Artists in the Family and Art Training x Artists in the Family interactions were observed on Ab scores. Rewards enhanced Ab responses in subjects who had artists in the family, $\underline{F}$ (1,53) = 6.85, $\underline{p}$ = < .01, and who had received previous training in art, $\underline{F}$ (1,53) = 5.82, $\underline{p}$ = < .02. Also, Abstract responses were facilitated when subjects had had previous art training but no artists in the family, and when subjects had artists in the family but no previous training in art, $\underline{F}$ (1,53) = 4.22, $\underline{p}$ = < .04.

Significant interactions involving reward were also found on developmental variables. A Reward x Art Training x

Artists in the Family interaction was significant on FA, F (1,53) = 4.43, p = < .04. Rewards had the most detrimental effect on subjects who did not have previous training in art or artists in the family.

A Reward x Sex and a Reward x Sex x Art Training interactions reached significance on Sh. Reward had a detrimental effect of male subjects but not on female subjects, F (1,53) = 7.12, p < = .01. Also, when subjects had previous art training, reward had a detrimental effect; however, when subjects had no previous training in art, reward had a detrimental effect only in male subjects but an enhancing effect on female subjects, F (1,53) = 7.58, p = .009.

Finally, a Sex x Artists in the Family interaction reached significance on Form Definetness (FD), F (1,53) = 5.07, p = < .03. Male subjects with artists in the family obtained higher scores than those with no artists in the family, while female subjects with artists in the family obtained lower FD scores than those with no artists in the family.

Sex, Art Training and Artists in the Family seem to mediate the detrimental effects of reward on Form Appropriateness (FA) and Shading (Sh).

Comparison between Session I and Session II Performance

Session II performance was evaluated in terms of Session I performance through a 4 Groups x 2 Sex analysis of variance. Mean HIT difference scores and standard

deviations are presented in Table XIV, in Appendix B. This analysis yielded significant Groups main effects and Groups x Sex interactions.

Groups main effects were significant on C, $\underline{F}$ (3,53) = 5.56, $\underline{p}$ = < .002 and Sh, $\underline{F}$ (1,50) = 4.81, $\underline{p}$ = < .005. Subjects from all four groups obtained higher C and Sh responses in Session II than in Session I, regardless of rewards. Subjects from Groups 2 (reward-to-nonreward transition) obtained higher C and Sh scores in Session II (under nonreward) than subjects in Groups 1, 3, and 4. Subjects in Group 4 (reward-to-reward transition) obtained lowest scores.

Significant differences among groups were also obtained in PV scores, $\underline{F}$ (3,53) = 6.68, $\underline{p}$ = < .001. Subjects from Groups 4 and 2 obtained considerably higher PV scores in Session I (first time rewarded) than in Session II (nonreward for Group 2 and third time reward for Group 4). PV Scores from Group 3 subjects were higher under reward than nonreward groups. PV scores from Group 1 subjects, the control group, did not differ from session to session. From this comparison, it can be stated that monetary rewards did increase PV scores. However, PV Score increments do not seem to be a function of the cummulative offering of rewards.

A Groups x Sex interaction reached significance on I, $\underline{F}$ (3,53) = 3.99, $\underline{p}$ = < .01. The offering of reward enhanced I scores of female subjects, while male subjects performed

best under nonreward conditions. Males from Group 2 (reward-to-nonreward transition) obtained higher Integration scores on Session II, (under nonreward conditions), while female subjects obtained higher I scores on Session I. (under reward conditions). Male subjects from Group 4 (reward-to-reward transition) obtained higher scores on Session I (first time rewarded), while female subjects obtained higher scores on Session II (third time rewarded). Male and female subjects from Groups 1 and 3 obtained similar I scores in both Sessions; however, Group 3 subjects obtained slightly higher scores on Session I (under nonreward instructions) than on Session II (second time rewarded). The cummulative offering of rewards tended to deflate I scores in male subjects, but in female subjects cummulative monetary rewards had an enhancing effect.

Another Groups x Sex interaction approached significance on H, $\underline{F}$ (3,53) = 2.50, $\underline{p}$ = < .07. The greatest difference in H scores were observed among male and female subjects from Group 2. Group 2 male subjects obtained higher H scores under nonreward instructions, while female subjects obtained higher scores under reward instructions. Differences in performance were also observed in Group 4 subjects. Group 4 male subjects obtained considerably higher H scores than female subjects during Session I, while both, male and female subjects obtained higher H scores on Session I than on Session II. The cummulative offering of rewards tends to deflate H scores mainly in male subjects.

Correlation between selected HIT variables and judges' ratings of Creativity and Craftsmanship

Pearson product-moment coefficients of correlation were calculated for ratings of Creativity and Craftsmanship with selected HIT variables such as CC score, Factor I, Factor II, and Factor III (See Table XIV, in Appendix B). In general, correlation coefficients were not statistically significant. However, judged artistic creativity tended to correlate positively with all four HIT cluster of scores, while negative correlations or correlations approaching zero, were found between judged technical skill and HIT composite scores.

Discussion

The major finding of this study was that monetary rewards can affect perceptual organization and artistic performance, and that the effect of monetary rewards is influenced by such individual differences as sex of subject, and whether or not the subjects had previous art training or artists in the family.

Rewards enhanced artistic creativity, as rated by art and design experts, and increased scores on some HIT variables linked with associational/affective mental functioning. Rewards on the other hand, had a detrimental effect on subjective ratings of craftsmanship or technical skill and some HIT variables associated with highly cognitive functioning.

Artistic Performance

Considering between group (reward vs nonreward) comparisons, judges' ratings on Creativity, Aesthetic Value and Overall Rating revealed a definite pattern, although nonsignificant, favoring rewarded over nonrewarded subjects.

When the effects of monetary rewards were assessed in relation to initial performance, the artworks of rewarded subjects were perceived as more creative, of higher aesthetic value, and received higher overall ratings under reward (Session II) than nonreward (Session I) conditions. The nonreward subjects and the control subjects did best in Session I

Judge ratings on Craftsmanship, however indicate a detrimental effect of rewards. The detrimental effect of monetary rewards on Craftsmanship obtained in the present study, has also been observed when extrinsic constraints have been imposed upon subjects. Amabile (1977) found that when subjects received specific instructions on how to be creative and were told that their work would be evaluated on creativity, their creativity was high but their technical skill decreased.

A possible explanation for the differential effects of monetary rewards may relate to the nature of artistic creativity and craftsmanship. Since creativity in artistic performance is essentially a dimension depending on internal criteria, the individual who relies most heavily on inner images and affects will be more likely to emerge with an

interesting, more original idea or product. The artistically creative act demands divergent thinking processes, an aroused emotional state, and a minimum of highly cognitive functioning.

Craftsmanship or technical skill, on the other hand, relies heavily on the cognitive awareness of pre-established rules and relationships. Technological knowledge relies heavily on convergent processes for which intellectual functioning is vital.

If creativity is assumed to be linked with affective (evolutionarily primitive) processes and craftsmanship with highly cognitive (more recent) processes, then, according to MacLean's (1970) triune concept of the brain, and as suggested by McCullers et al., (1979), rewards would be expected to have no effect on artistic creativity but a detrimental effect on technical performance.

In addition, the judges perceived a detrimental effect of rewards on the technical aspects of performance only of subjects who had had previous training in art and therefore, were most advanced in technical knowledge.

The differential detrimental effects of rewards on the technical performance of individuals with and without previous training in art is also plausible within the notion of developmental regression. If material rewards cause a reward-induced developmental regression, this regression would be more likely to occur in individuals who have reached higher levels of (skill) development, rather than in

individuals who have not advanced much in the developmental continuum. Thus, reward-induced regression in technical performance, would be expected to be more pronounced in individuals who had had previous training in art rather than in those individuals who had never had training in art.

Although this argument is highly speculative, it offers a conceptual frame of reference for explaining the differential effects of rewards on artistic creativity and craftsmanship or technical skill.

Questionnaire Self-Reports

In the present study, the offering of rewards enhanced the subjects intrinsic motivation for the art activity, Whether these measures would be similar to behavioral measures of intrinsic motivation is not certain. Previous research indicates that self-reports and behavioral assessments are not equivalent (Fabes et al., In press).

Other researchers (Harter, 1977) have contended that if a task is not optimally challenging , then rewards might make it more challenging, enhancing intrinsic motivation for the task. In the present study, based on initial self-reports before reward administration, the subjects did not perceive the art activity as an optimally challenging activity; thus, this initial perceived lack of attractiveness of the collage activity, might mediate the effects of rewards on interest level obtained in this study.

The Holtzman Inkblot Technique

Analyzing quantitative results, discriminating

variables, appear to fall into three categories: 1) perceptual organization and maturity, 2) emotional disturbances, and 3) creativity.

Rewards and HIT Variables Associated with Perceptual Organization

The high elevations on M and H of reward subjects, indicate richer perception and productive imagination. Rewarded subjects also obtained higher scores, although nonsignificant, on I, P, FD and Br suggesting that subjects in the reward condition integrated ideational ability, had appropriate reaction to stimulus, and well differentiated ego boundaries.

The highly significant difference between reward and nonreward groups on Factor I indicates that rewards did not have a detrimental effect on perceptual organization as measured by the HIT. However, higher Factor I scores do not necessarily mean higher intellectual capacity. As Holtzman et al.(1968) point out "inkblot scores with the occasional low-order exception of I, M, and FA, have no relationship to verbal intelligence" (p.179). Frank (1979) has conducted a series of research studies in an attempt to clarify the relationship between M and intelligence. Based on recent findings he suggests that M is more reflective of the capacity for imagination and fantasy rather than an index of intelligence. If the premise regarding the noncognitive, evolutionarily more primitive nature of imagination and fantasy is accepted, rewards would be expected to have an

enhancing effect in the production of M HIT responses; that is, responses containing high dynamic movement.

According to the developmental regression hypothesis, rewards would be expected to have a detrimental effect on variables that demand more reality-oriented and logical responses. This hypothesis was confirmed to some extent. Rewards deflated FA, I, and H scores mainly of male subjects, and when rewards were offered for a second and third times the effect was increasingly detrimental, suggesting that perhaps the repeated administration of rewards may be cummulatively detrimental on some HIT variables linked with highly cognitive processes. Sex of subjects, previous training in art and artists in the family were important variables mediating these detrimental effects of reward. Fabes' et al.(In press) study on the effects of material rewards on inkblot perception and organization, revealed similar findings. These researchers observed a detrimental effect of rewards on FA scores of male more so than female subjects. In the same study, reward subjects scored significantly lower than nonreward subjects on FD, Sh, and RT.

Rewards and HIT Variables Associated with Emotional Disturbances

According to Hartung and Skorka (1980), high PV scores is not sufficient evidence for psychopathology. To clearly establish the presence of disturbed and disordered thinking, scores on other HIT variables associated with highly

cognitive functioning, such as I, H, FA, A, P, Br, Ab scores should be low while PV, and Sx, and At scores should be high (Megargee & Velez-Diaz, 1971). Also, before adequate intellectual functioning could be diagnosed, the relationship between FD and FA should be balanced.

Considering the above parameters, the results from this study seem to indicate that rewards did induce emotional disturbances mainly in male subjects without past art training and without artists in their families. Reward subjects produced a substantially greater number of FC and QR responses and significanly more Al responses than nonreward subjects. Although high FC and QR scores are not necessarily associated with psychopathology of thought (Swartz, 1969), AL responses are. Also, whether or not very high FC, FB, and QR responses, as it was observed in rewarded subjects in this study, are indicative of bizarre thinking is yet to be determined.

At the same time, rewarded subjects produced significantly lower scores on HIT variables associated with highly cognitive functioning (e.g., I, H, FA, P, Ab, and Br). Finally, reward subjects, specially males, tended to score more so than nonreward subjects, above average in FD, and below average in FA, obtaining a less balanced relationship between these two variables.

A study by Richter and Winter (1966) revealed that creative subjects showed more signs of emotional disturbances than less creative ones. In the present study,

the subjects who produced highest PV scores obtained highest ratings on artistic creativity, but lowest ratings on craftsmanship as indicated by correlations between HIT Factor III scores and subjective ratings of creativity and craftsmanship, specially during Session I, where differences in HIT performance between reward and nonreward groups were statistically significant. Reward induced emotional disturbances then may be beneficial to artistic creativity , even though they would be detrimental in tasks requiring logical, cognitive processes.

The capacity to produce PV responses seem to be enhanced by previous training in art and by artistic talent running in the family. Anderson & Cropley, (1966) suggests that persons who are naturally creative in an artistic way may be high on a scale of psychopathology. She concludes that there may be evidence to indicate that psychopathological thought is an affective disorder rather than schizophrenia. Rewards may induce psychopathologic thought which in turn can enhance creativity, but only in those subjects with artistic background (artists in the family or previous training in art).

Studies performed by Krippner (1977) on psychedelic drugs and brain functioning have some relevancy to these findings; since, as proposed by McCullers et al., (1979), material rewards may stimulate reward centers in the brain, in a similar way drugs stimulate these brain structures. Krippner's studies suggest that psychedelic drugs could

evoke original ideation and imagery which was used for unique products or acts only in the case of accomplished and talented artists. Many subjects of psychedelic drug experiments reported unusual sensory experiences and sensational imagery and ideas, yet they were not able to create or produce some product, performance or idea.

Rewards and HIT Variables Associated with Creativity

A third category of HIT scores to be discussed is the Creativity Composite (CC) score, which is defined by the following variables: L, C, M, Hs, Ax, and Pn.

In the study of creative behavior, M, C, and L have been traditionally the most important variables. Administering the Rorschach protocols to artists and nonartist subjects Dudek (1960) found that Low M subjects showed great difficulty of creative expression in three different media used (writing, drawing and making desings), while High M subjects showed great ease of creative expression in all these three media. In the present study, rewards increased significantly M scores and at the same time facilitated artistic creative expression, as measured by judge ratings.

Another important finding from Dudek's study refers to the capacity of artists to generate many M responses upon request. Subjects who were nonartists but who produced high number of M responses, had great difficulty in producing additional M responses, while artists showed a great ease in the generation of M responses, even when initial production

of M responses was very low. Dudek's finding regarding the artists capacity to produce high M responses upon request suggests a plausible explanation for the above-average M scores obtained in the present study by reward subjects. Among the subjects who participated in this study, some were professional artists, others had had previous training in art and close relatives with recognized artistic background and most were seeking art related degrees.

Movement-Color balance has also been used to study creative capacity. Highly creative and productive artists have been found to give very high M and C responses (Dudek, 1960), demonstrating greater capacity for imagination and fantasy, or inner directedness.

In the present study, reward and nonreward subjects obtained M-C relationships (higher M than C), which suggest introversive, inner directedness tendencies. However, the M-C relationship of the rewarded group (high M and low C), suggests that rewarded subjects demonstrated greater introversive tendencies than nonrewarded subjects.

A third variable relevant in the study of creativity refers to the capacity to respond to the blot as a whole rather than as fragmented details. Reward subjects in the present study, gave more whole blot responses (low L scores), than nonreward subjects, although this difference was nonsignificant.

The extent to which HIT creativity scores are correlated with intelligence, has not been clearly

established. Qualitative aspects of M and L scores are important in determining the relationship between M and L scores and intelligence. However, HIT M and L scores do not take into account qualitative aspects of M and whole responses. Allison and Blatt (1964) for example emphasize that only cognitively complex and accurately perceived whole responses are related to intelligence. Dudek (1960) also refers to the importance in determining qualitative aspects of the M response such as: variety or uniqueness of responses, constructiveness of content or human/animal content, in the interpretation of the meaning of high M scores. The HIT M variable measures only the dynamic quality or strength of the M response; however, the dynamic quality alone has not been found to be related to creative productivity (Dudek, 1960).

Similar significant reward interactions with sex, art training, and artists in the family were obtained with L scores, as were observed with FA and I. In other words, reward male subjects, without art training and without artists in the family tended to experience poorly integrated imaginative ability (low I scores), less contact with reality (low FA scores), and focused more often on smaller areas of the blots (high L scores).

It is of interest to note, rewards decreased L scores (low scores are desirable) the most, when subjects were male, had previous training in art and artistic family background.

Relevant to these results obtained in the present study are Hartung and Skorka's (1980) findings on the effects of psychedelic drugs on HIT performance. Psychedelic drug users and non-users matched by age, sex and amount of education were given the HIT. Psychedelic drug users scored significantly higher than non-users, on M, H, PV, Hs, Sx, Ab, and C. In the present study monetary rewards influenced all these variables in one way or another. Monetary rewards had a direct enhancing effect on some of these variables (M, H, and PV); sex of subjects was found to be a mediating factor with other variables (Hs and Ax). An finally, previous art training and artistic background of the family were factors also associated with the enhancing and detrimental effects of rewards on yet another set of HIT variables (C and Ab).

Summary and Conclusions

In the present study, the authors attempted to assess the effect of material rewards on tasks that involved cognitive and affective processes.

It was assumed that this cognitive-affective task dimension may possibly mediate the effects of rewards on task performance. In one component of this study, an attempt was made to determine the effects of monetary rewards on two dimensions of artistic activity, creativity and craftsmanship, which presumably require emotional and cognitive processes, respectively.

It was hypothesized that: 1) monetary rewards may

enhance artistic creativity, due to the less logical and more emotional nature of artistic activity; and, 2) that monetary rewards may have a detrimental effect on craftsmanship this aspect places a because this aspect places a relatively greater demand on cognitive, intellectual functioning.

A second component of this study, was designed to examine the effects of monetary rewards on perceptual processes. For this purpose, the HIT was administered to the same subjects also under reward and nonreward conditions, in order to: (a) test the validity of the reward-induced developmental regression hypothesis; and, (b) examine the relationship between HIT creativity scores and judgments of creative expression in an art activity.

The subjects for this study were undergraduate students enrolled in Introductory Art courses. Subjets were tested in groups , by their own instructors and by an experienced research assistant in their usual art studios.

The findings supported the hypotheses to some extent. It was found that: (a) Rewards had an enhancing effect on Creativity, Aesthetic Value and Overall Rating, and (b) Rewards had a detrimental effect on Craftsmanship. Sex of subjects, was found to mediate the detrimental effect of rewards.

Monetary rewards significantly increased scores on M, H, PV, Factor I, and Factor III. On some other HIT variables, like developmental variables associated with

highly congnitive functioning, and variables associated with creativity, the effects of rewards were mediated by sex of the subjects, previous training in art and artistic background of the family.

Monetary rewards had a pronounced enhancing and detrimental effects on male subjects only. Furthermore, male subjects who had previous training in art and artists in their families, obtained higher scores on HIT variables associated with creativity, while male subjects without previous training in art and without artistis in their families obtained lowest scores in variables linked to creativity and highly cognitive functioning.

In sum, subjective ratings of art works and HIT scores suggest that monetary rewards may enhance artistic creativity , and that this enhancing effect may be mediated by the somewhat emotional nature of artistic activity and by a reward-induced regression toward more primitive (i.e., more emotional, and more psychopathological) responding.

The data provide some ancilliary support for the developmental regression hypothesis, in that cognitive, logical functioning was lower under reward for some type of subjects.

Several variables have been isolated as having some relation to material rewards. Fabes et al. (1981) in a previous study found reward to be linked to the speed to which the subjects responded to the Hit (Reaction Time). Material rewards caused college students to respond in an

impulsive manner, more characteristic of children than adult individuals. In the present study, several HIT variables, such as M, PV, and H were found to be directly linked with material rewards.

Further study of the relationship between rewards and these variables may be useful in gaining a better understanding of the developmental regression phenomenon.

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APPENDIX A

REVIEW OF LITERATURE

Creativity and Rewards: A Review of the Literature

The study of creativity has fascinated ancient philosophers as well as modern psychologists. Perhaps one of the reasons why this has been so is due to the allusiveness of the concept of creativity and to the tremendous implications it has for human behavior. J.P. Guilford , a precursor in the study of creativity wrote: "the most urgent reason for studying creativity is that we are in a mortal struggle for the survival of our way of life in the world" (1959; p. 161).

What is creativity? Many definitions have been advanced (Taylor, 1959; Bartlett, 1959; Kubie, 1958; Guilford, 1967; Rhodes, 1961; Rogers, 1962; Simpson, 1962; Torrance, 1962). In spite of the fact that definitions of creativity are abundant, to the present time there is no universally accepted definition and method for its study.

Perhaps what makes it difficult to examine creativity by research methods is the fact that the criteria to determine creativity is relative to cultural standards and historical occurrance. What is judged creative in one culture may not be so in another. Moreover, what is thought to be creative in a particular culture changes with time. Productions judged creative today might not have been considered so a generation ago.

Such fluctuating standards for creative effort come about by changes in the values emphasized by a society or a culture. Consequently, one of the continuing challenges of

creativity research is finding criteria which encompasses these cultural changes.

With increasing study and discussion of creativity, a body of material has become available for critical analysis. Some of it is the result of research; however, more of it is speculative. Generally accepted definitions of creativity encompass two basic concepts: 1) creativity involves the novel, ingenious, imaginative, original or unsual, either in approach, method or final production; and, 2) the creative effort and product must be appropriate apt, fitting, and relevant (Trowbridge & Charles, 1966).

Theories of Creativity

Artistic Creativity as a Regressive Process

One of the most flexible and powerful models of creativity comes from Psychoanalytic theory. According to this model, the creative act can be conceptualized as a special form of interaction between primary and secondary process thinking in which a novel idea or insight is generated by the loose, illogical and highly subjective ideation of primary process into a context that is socially appropriate and meaningful to others.

According to Suler (1980), Freud (1953) conceptualized creativity as a sublimatory process in which repressed affect associated with intrapsychic conflict could be discharged. The creative process in Freud's view expresses unfulfilled wishes originating in early childhood experiences. This suggests that unconscious conflict is a

prerequisite for creativity -- an idea often exagerated into the popular notion that misery is a necessary adjunt of artistic talent. Freud (1953) noted an important difference between the artist and ordinary men. The artist has a special insight of his/her intrapsychic processess and are able to elaborate his/her private unconscious thoughts into a form that is communicable and meaningful to others. In Freud's opinion this is accomplished through the artists exceptional ability to control regressive and sublimatory processes.

Although Freud (1933, 1958) was first in suggesting the distinction between primary and secondary mental processes, as two separate but interrelated mental functions, he never did integrate his views on creativity into a systematic theory.

Freud's views on creativity have been expanded by several theorists, one of them was Ernest Kris. Kris (1952) unlike Freud, underplayed the role of intrapsychic conflict and sublimation of instinctual impulses in creativity and instead shifted emphasis to the concept of conflict-free and autonomous ego functions (Suler, 1980).

Kris described this autonomous function as the ego's ability to regress to unconscious tought processes specially for the purpose of using unconscious affects and fantasies in producing a creative work. This is a partial, temporary, and controlled lowering of the ego function that promotes adaptation hence the equivalent term "adaptive regression".

According to Kris (1952) regression in the service of the ego involves an inspirational phase and an elaborational phase. In the inspirational phase, Kris hypothesized that the ego temporarily loosens its control of thinking processes, to permit a regression to primary process thinking. Through this regression, the person gains access to the illogical and unmodulated affects, ideas, and images of the unconscious. The discharge of energy that occurs during this type of thinking through displacement, symbolization and condensation is pleasurable and constitutes a major motivating force underlying creativity.

During the elaborational phase, the ego restores its former position of strength, tha is the countercathetic barrier is reinforced. The reality principle is reinstated and ideas perhaps unintelligible ones are subjected to rigorous logical evaluation.

Basic to this notion of regression in service of the ego is the idea that certain forms of creativity involve the access of secondary process to primary process thinking. By describing this as a regression an assumption is made that the shift to primary process is a regression to a more primitive cognitive style. Only through the careful reworking by secondary process can the insights generated through primary process be meaningfully incorporated into the creative work and communicated to others.

In accounting for how an insight may suddenly leap into consciousness in a partially or fully synthesized form,

several theorists have hypothesized the existance of various preconscious thought processes (Fishcer, 1954; Kris, 1952; Kubie, 1958). These preconscious functions are responsible for the reworking of primary process content outside of the boundaries of awareness.

The preconscious is considered the possible arena in which primary and secondary processes converge and in which creativity is maximized, as unconscious illogical and fantasy are counterbalanced by the demands of the reality principle.

In recent years important theoretical questions have been postulated challenging the validity of Kris' notion of regression in service of the ego.

Several neo-psychoanalists (Bush,1969; Noy,1969) have proposed that instead of viewing the creative act only as a regressive process, an alternative approach would be to focus on the interaction of primary and secondary processes as two independent cognitive functions that develop and change over time.

Noy (1969) suggests three aspects of primary process to consider. One aspect refers to the highly subjective, unconscious primary process, which does not require external feedback. This aspect of primary process resists developmental incorporation and represents highly primitive functioning. Noy has labeled this type of primary process "old program".

A second aspect refers to primary process which is not

throughly integrated to secondary process faculties, but retain its illogical quality as in fantasy and daydreams.

Finally, a third aspect refers to primary process styles that become permanently incorporated into stable secondary process operations -- such as symbolism and imagery -- incorporations that probably occur during early development.

According to this view, different forms of creativity, like scientific and artistic creativity, would require different kinds of interactions, that is interactios of the secondary processes with different levels of primary process functioning.

In sum, psychoanalytic theory provides two general explanations of the creative process. Traditionally intepreted, the creative process involves a temporary but direct access or regression to primary process thinking for the purpose of using that ideation in generating creative insights. The control and synthesis of primary process by the realityoriented secondary process is essential in the creative act. Revisions and reinterpretations of this traditional view indicate that creativity may also be mediated by those cognitive activities that are derived from the permanent incorporation of primary process styles such as symbolism and imagery, into stable secondary process operations (Suler,1980).

The association of regression with creative activity is also evident in the works of Werner (1957). Werner's

developmental theory states that a creative person is able to use cognitive processes at different developmental levels, as evident in his or her ability to shift between primitive cognitive styles that are characterized by diffuse, unmodulated thinking and more mature cognitive styles in which integrative processes predominate.

Artistic Activity as Problem Solving

A second approach in the study of artistic creativity has emphasized the similarities that exist between problem solving abilities and the creative process.

Whether or not problem solving processes are part of artistic activity is yet to be resolved. Some view artistic activity and problem solving as essentially different realms of human experience. Positivists, in the field of logic, have traditionally associated problem solving abilities with such fields of knowledge, like science, mathematics, physics, etc., where the term is used in its most rigorous and clear form (Morris & Nagel, 1934). Problem solving is defined as a convergent cognitive process in which only one or a few right answers are sought. Creative thinking on the other hand, as it is expressed in art, is viewed as divergent cognitive process in which many solutions are feasible with no right or wrong answers.

Among the most well known models to study problem solving abilities as they apply to scientific creativity are Gestalt models from Wertheimer (1945) and Kohler (1969); Wallas' Model (1926) and Rossman's Model (1931).

More common sense views, emphasize a fundamental similarity between problem-solving and creative thinking. Problem solving requires cognitive generation of alternatives in search of an appropriate solution. As in creative thinking familiar patterns and relationships must be transcended to that elements can be rearranged or restructured into new patterns that satisfy the requirements of the problem. Successful completion of the task requires the ability to distinguish the relevant from the irrelevant and to generate and test models until a solution is rediscovered.

John Dewey's (1910) problem solving model has served as framework of reference for significant number fo investigations about problem solving abilities. Dewey pinpointed several steps in a typical problem solving situation: 1) awareness that a problem or difficulty exists; 2) analysis of the problem, leading to understanding of its nature; 3) suggestion of possible solutions; 3) testing the alternative solutions by a process of judgment; and, 4) accepting or rejecting solutions.

For Dewey, all experience is problematic by degree, ideas and beliefs are the outcome of the human organism's interaction with and adaptation to the environment. Nevertheless, the pattern of logical inquiry and its problem solving structure are essentially similar or analogous to other problem solving models. Dewey, however, makes a

distinction between logical inquiry and common sense inquiry; in the latter, problems are more loosely dealt with as problems of "use and enjoyment"--they are in the context of individual and immediate human situations. It is at this level of human thought and action where artistic (and aesthetic) experience is formed. Thus; the meaning of problems in art are loosely (or metaphorically) defined and designate thought activity necessary for apprehending and giving significance to sensory and immediate phenomena. Artistic creativity may involve non-verbal and non-conceptual experiences which are essentially incompatible with problem solving (Marshall, 1968).

Creativity as Divergent Thinking Ability

Another major approach in the study of creativity has focused on the intellectual abilities that might contribute to creative thinking and creative performance. Guilford's Structure of the Intellect (SI) model is a precursor of the study of creativity as essentially a divergent thinking production. Guilford (1952) conceived of the human intellect to be a collection of 120 unique and independent abilities. He acknowledges the limitations of the SI model by refering to the fact that this model does not include all the factors of the human intellect. He believes many factors are undiscovered because of a lack of means to measure them. Within this theoretical framework, Guilford formulated some primary traits of creativity which include fluency, originality, flexibility, elaboration and

transformation, these traits in turn define divergent thinking abilities. Fluency refers to the ability to vary one's ideas over a wide range such as giving many different categories of possible uses for a brick, rather than offering uses that all fall within the same general category. Originality, refers to the making of responses that are statistically unique or unusual, such as the giving of uncommon uses for a brick. Elaboration, refers to the ability to add considerable verbal, figural or ideational detail to answers which initially have been presented in a simple way. Finally, transformation refers to the ability which pertain to revising what one experiences or knows, thereby producing new forms and patterns.

Two lines of further research stem directly from the work of Guilford, the works of E.P. Torrance and of Getzels and Jackson. These authors have developed tests of creativity which consist in sampling the same divergent thinking skills suggested by Guilford.

Creativity as Associational Process

A fourth major approach in the study of creativity comes from Association theory. Proponents of this approach also assume an important role of intellectual abilities in the creative process. However, they narrow down the kinds of intellectual abilities that may possibly be related to creativity. According to this approach, only associative processes are involved in creative behavior.

The origins of the association theories of creativity

can be traced to the British empiricists such as Hume and J.S. Mill, who believed that associations among ideas form the basis of thinking. To explain creative thinking, association theorists believe that creativity results from the number of unusualness of associations.

Three major lines of research can be delineated in this theoretical approach: the work by Maltzman and his colleagues (1958; 19660; 1964), who have dealt with training in the giving of associative responses; the work by Mednick (1962) which concentrates mainly in the validation of the Remote Associates Test (RAT); and, the work by Wallach and Kogan (1965).

Maltzman's (1960) research is based on the assumption that originality can be learned and that the same principles of conditioning hold as in other forms of operant behavior. Originality, or original thinking in this context is defined as behavior that occurs relatively infrequently, is uncommon under given conditions, and is relevant to those conditions. In order to facilitate the occurance of original behavior, Maltzman resorted to different techniques, such as repeatedly evoking different associations to the same stimulus, and instructions to be original, or evoking many uncommon responses.

According to Mednick's (1962) associative theory of creativity, the creative process is the "forming of associative elements into new combinations which either meet specified requirements or are in some way useful" (p. 221).

Creativity increases as the number of associations in a subject's response repertoire increases and as the elements of new combinations become more remote from each other.

A highly creative person has a flat associative hierarchy, which is characterized by few dominant responses to a given word but many responses of medium strength. A less creative person, on the contrary, has a steep hierarchy which is characterized by a high strength for one or two responses to a given word, and quite a low strength for all others.

The RAT (Mednick & Mednick, 1967) has been developed as a measure of this type of creativity. In each of its 30 items the subject is asked to provide one word as the mediating connecting link among three mutually remote words. In every item the linking word is strickly associative rather than following formal logic, concept formantion or problem solving.

Wallach and Kogan (1965) formulated their definition of the creative process in terms of two main criteria: first, "the production of associative content that is abundant and that is unique; second, the presence in the associator of a playful, permissive task attitude" (p. 289).

The first consideration aimed at describing the quantity and remoteness of ideas as attibutes of the associative process most relevant for creativity.

With respect to the second criteria, Wallach and Kogan (1965) imply that a game-like evaluation-free testing

context is required for the separation of creativity from IQ and achievement, and that it should lead to higher level of performance than other testing conditions.

Creativity and Perceptual Processes

In his book, Metamorphosis (1959), Schachtel elaborates a perceptual theory of the creative process. He assumes that the motivation for creativity lies in the need to relate to the external world. Creativity results from an external openness which allows an object to be approached repeatedly from varied perspectives. This perceptual activity is accompanied by intense interest, and is not bound by the rules governing conventional thought processes.

The creative act according to Schachtel (1959) does not represent a regression as it may be conceived in psychoanalytic theory, but rather a progression of development.

Creativity as a Function of Personality and Motivational Characteristics

The psychological study of the creative process has also been undertaken by theorists who have emphasized personality and motivational characteristics of creative individuals. Rogers (1959) and Maslow (1959, 1967) have developed humanistic theories of creativity. Rogers (1959) defines the creative process as "the emergence in action of a novel relational product, growing out of the uniqueness of the individual on the one hand, and the material events, people, or circumstances of his life on the other" (p. 71).

Rogers believed furthermore that certain conditions within the individual are associated with creativity: an openness to experience, an internal locus of evaluation, and the ability to toy with elements and concepts. Unlike other theorists, Rogers was not especially concerned with the appropriateness or usefulness of a creative product.

Maslow (1959) set forth the concept of "self-actualizing creativeness" (p. 85). People with this capability are said to possess a special kind of perceptiveness, an ability to be less controlled and inhibited in their behavior, and a freedom from stereotypes and clishes. These people often are attracted positively by the unknown, the mysterious, or the puzzling rather than being frightened by it. He investigated the "peak experiences" of highly creative people. One main finding refers to the necessity of possessing integration within the self and therefore between the person and the world prior to experiencing a "peak experience". Maslow (1959) pointed out that in the mentally ill person creativity is greatly hampered and emphasized that creativity occurs in the well adjusted.

Other concepts related to the motivational viewpoint are Allport's (1937) functinal autonomy theory; Goldstein's (1939) self-actualization thesis; May's (1975) and Wertheimer's (1945) self-satisfaction or mental health motives; Taylor's (1976) theory of environmental stimulation; Golann's (1962) creativity motive postulate and

White's (1961) urge toward competence. Jung's (1928) activation of the archetype; Hart's (1950) integrative force; Maddi's (1965) need for novelty and Barron's (1963a) "moral attitude" motive.

Empirical Evidence

Creativity and Regression

The idea that creativity is facilitated by access to relatively primitive modes of cognition is a fundamental aspect of the psychoanalytic theory of creativity, and as such has been a focus of considerable research for many years.

Accumulating evidence suggests that creative individuals, as compared with noncreative normals are characterized by certain cognitive flexibility, that is, they have greater availability of both the relatively mature and the relatively primitive cognitive processes.

Studies in which the subjects have been artists of established reputation have been highly successful in finding this cognitive flexibility distinguishing accomplished artists from less successful ones. Artistically creative subjects have been found to express a greater amount of primary process, with primary process well integrated with secondary process, indicating its control by the ego. Cohen's (1961) subjects were art students chosen by their professors as being highly creative; Dudek (1968) utilized successful sculptors, painters, and writers; Myden (1951) studied outstanding painters, musicians and

choreographers.

Hersch (1962) studied eminent artists, non-creative normals (firemen, salesmen, entrepreneurs), and schizophrenics. The results of this study supported Werner's (1957) developmental theory revealing the artists' greater availability of both mature and primitive cognitive processes as compared with normals. The schizophrenics, however, were limited to primitive thought processes with little use of the more mature integraive functions. This study suggests that regression is possibly a crucial factor in the artist's cognitive functioning mediating creative expression.

Rogalski (1968) however, suggests that regression or access to primary process thinking may not be indispensable for all forms of creativity. Artists rely more on affective, emotional and drive related contents, whereas scientists may have a need to be more objective and concerned with reality. Likewise, regression may not be possible at all developmental levels. Children may not be able to master the type of cognitive flexibility suggested by psychoanalysis or Werner's theory, due to children's limited cognitive capabilities and their lack of ego controls.

Although the distinction between artistic and scientific creativity in terms of regression to primitive modes of thinking is highly speculative, the conceptualization of the creative act as a regressive

process has received substantial empirical support.

Divergent Thinking Abilities and Regression. The relationship between performance on divergent thinking tests and expression and control of primary thought processes has been documented to some extent. Pine and Holt (1960) found a significant correlation of primary process control with two Guilford tests of divergent thinking abilities. Gamble and Kellner (1968) replicated an earlier finding by Holt (1960). They observed that those subjects who gave a high number of mentally "primitive" responses to the Color Stroop Test also gave a high number of primary process responses on the Rorschach inkblots.

Wild (1965) found that art students produced significantly more adaptive drive content and more drive content than school teachers and schizophrenics in an adapted version of the Object Sorting Test. The art students demonstrated a greater availability and control of primary process, as compared with the other groups. They also were more able to shift from a cautious, conventional, "regulated" style to a more natural, "spontaneous" way of thinking.

Problem Solving and Regression. Pine (1959) and Pine and Holt (1960) have suggested that complex problem solving does not require a special access to primary process, but this access may be crucial to creative work in certain fields of science like biology, psychology, as well as in many fields in which work involves human drives, such as in

fine arts.

Blatt, Allison and Feirstein (1969) demonstrated that the expression of primary process was not critical for successful problem solving; however, the control of content primary process was. The high correlation between problem solving efficiency and control of content primary process is explained in terms of the ability to deal with cognitive complexity (Holt, 1966b; Von Holt, Sengstake, Sonoda & Draper, 1960).

Cognitive complexity as defined by the Revised Art Scale of the Welsh Figure Preference Test, has been found to be characteristic of research scientists (Gough, 1961); of creative architects (MacKinnon, 1961); of musicians and painters (Raychaudhuri, 1966b). These authors state that cognitive complexity develops early in life and it lacks relationship to training.

Creativity and Divergent Thinking Abilities

Studies of cognitive abilities and functions have derived their hypotheses from Psychoanalitic theory, Association theory and Gestalt theory.

The relationship between creativity and intelligence has received a good deal of attention in the literature for the past 50 years. The major effort in studying the characteristics of highly intelligent people is represented in the longitudinal study of Terman and his colleagues (Terman, 1925, 1954a, 1954b; Burks, Jensen & Terman, 1930; Terman & and Oden, 1947). Although there was no criterion

of creativity in these studies, they illustrate the impact that intellectual capacity has on creative productivity. Intelligence alone however, did not lead to outstanding achievement of Terman's gifted subjects. There were critical backgroud, personality, and social factors that accounted for differences between "more" and "less" successful groups in this sample. Other researchers concurr with Terman's observation (Roe, 1952).

The turning point in the study of the relationship between intelligence and creativity started with the work of Guilford and his associates. Guilford has concentrated on measures of intellect which would tap abilities that are presumably not usually involved in tests of intelligence. These abilities were operationalized in tests designed to measure what he called divergent thinking process. Divergent thinking is a mode of productive thinking which tends toward the novel or unknown. It is this novel output which he considered the essence of creative performance.

To assess the validity of Guilford's ideas researchers have posed several key questions. The first question which logically is raised by them is whether or not mental operations involved in tests of divergent thinking abilities are related to creativity, and to other variables (such as personality characteristics) that would be expected to be related to creativity.

By means of multivariate methods of factor analysis, Guilford and his associates have supported 16 of 24

hypothesized intellectual abilities postulated to be related to creative productivity. A series of investigations have isolated most of these factors with different subjects: air cadets and young adult populations (Guilford, Christensen & Lewis, 1954; Guilford & Merrifield, 1960), with high school students (Guilford & Hoepfner, 1966), and with elementary school students (Merrifield, Guilford & Girshon, 1963).

Of particular interest to this study is the work of Lowenfeld and Beittel (1959) in which they found divergent thinking factors, identical to those reported by Guilford in highly creative visual arts students.

The Guilford tests of divergent thinking have also been found to correlate with personality characteristics that have been found to be related to creative productivity (Guilford, 1959b; Torrance, 1962b).

Another question posed by researchers in assessing the validity of the Guilford tests refers to whether or not divergent tests relate to a criterion of creativity. The results, thus far, have been contradictory and far from conclusive. There are several studies that fail to substantiate a significant correlation between divergent thinking abilities, as measured by Guilford tests of creativity. Beittel's (1964) findings indicate a lack of relationship between divergent thinking abilities, and performance in art of college art students. Skager, Kein, and Schultz' (1967) findings also indicate low and inconsistent relationships between three aspects of

devergent thinking -- redefinition, semantic spontaneous flexibility and associational fluency -- with artistic acheivement at a school of design. An analysis of the data in Drevdahl's (1956) study of arts and science undergraduate students revealed that those rated as highly creative by independent judges on personal and objective creativity ratings scales demonstrated superior performance on Guilford's originality tests, the scores of originality correlated .33 with the ratings. When divergent production scores of high school students obtained on Guilford like tests were correlated with teacher nominations for creativity, the correlations were generally low, on the order of .2 (Merrifield, Garner & Cox, 1964; Piers, Daniels & Quackenbush, 1960; Torrance, 1962). Yamamoto (1964a) noted similar low correlations between Torrance creativity measures and peer nominations as criteria. When divergent production tests were administered to eminent creative adults, they also correlated low with criterion ratings of creativity. With respect to architects judges highly creative by experts in their own field, MacKninnon (1961) established that whether scored for quality or quantity of responses, the Guilford tests neither correlated highly not predicted efficiently the degree of creativity demonstrated in the architects' creative production. Gough (1961) substantiating MacKinnon's (1961) findings by presenting evidence about the low and negligible correlations obtained between research scientists rated creativity and various

Guilford tests.

The Guilford tests have been found to be better predictors of academic-like success than of creativity in the sciences or the fine arts (Taylor, Smith, Ghiselin & Ellison, 1961; Barron, 1963a; Elliott, 1964).

According to Dellas and Gaier (1968), the lack of success of the objective tests of divergent productivity in predicting efficiency and in correlating with demonstrated creativity and other indices of creative performance may be attributed to several factors: the absence of an ultimate criterion for creativity, the lack of appropriateness of divergent thinking tests to measure creativity in different fields, and to the inability to incorporate personality factors that might contribute significantly to creative productivity.

A last question in assessing the validity of tests of divergent thinking abilities as tests of creativity refers to whether or not the Guilford tests are significantly correlated with intelligence tests.

In order to address to this question it is necessary to distinguish studies in which divergent production is defined by several cognitive abilities such as fluency, flexibility, originality and elaboration like in the Guilford tests, from other objective tests, like the Wallach and Kogan tests, in which divergent abilities are restricted to associative processes only.

In an extensive review of the studies in which the

Guilford tests and the Guilford-like tests, such as the Torrance's (1966) and the Getzels and Jackson's (1962) tests, have been used , Wallach (1970) presents substantial evidence regarding the high correlation of these tests with traditional measures of intelligence, thus arguing for the lack of validity of the Guilford tests and the Guilford-like tests, to measure creativity.

Wallach (1970) states that ideational fluency, one of the five dimensions originally proposed by Guilford, has been found to be statistically independent of intelligence and thus only this dimension could be considered a true test of creativity.

Several studies (Mednick, Mednick & Jung, 1964; Riegel, Riegel & Levine, 1966) have found substantial and positive correlations between ideational fluency and the RAT, thus suggesting the associational , non-logical nature of ideational fluency, as measured by the Wallach and Kogan test.

Associative components in thinking as measured by the RAT have been found to correlated moderately and positively with tests of intelligence (Mednick, 1963; Rainwater, 1964; Laughlin, 1967); however, when partialling out intelligence, highly significant correlations have been found with a criterion of research creativity (Mednick, 1963; MacKinnon, 1962a; Gough, 1967; Maltzman, Bogartz & Breger, 1960; Maltzman, Brooks, Bogartz & Summers, 1958; Maltzman, 1960; Maltzman, Simon, Raskin & Licht, 1958; Maltzman, Belloni &

Fishbein, 1964).

In sum, based on the research available to the present time, it seems that associational processesare different from cognitive processes measured in IQ tests.

Creativity and Personality Characteristics

Studies focusing on personality characteristics and motivational aspects affecting creativity have derived their hypotheses from psychoanalytic theory and humanistic theory.

Although cognitive characteristics are essential to creativity, it is apparent that they function not in isolation, but rather in relation to a total personality system of needs, attitudes, goals and emotions (Dellas & Gaier, 1968).

Some of the most useful findings about the relationship between personality components and creative achievement and activity come from MacKinnon's (1961) analysis of creative writers, Gough's (1961) work with research scientists, Raychaudhuri's (1966c) study of professional musicians in India, Cattell and Drevdahl's (1955) study of creative artists and writers, Roe's (1946a; 1946b; 1951a; 1952; 1953) studies of painters, artists, eminent physicists, biologists psychologists.

The findings of these different studies are essentially in agreement with each other. A core set of characteristics is evidenced in a fairly wide range of domains, such as in art, literature, music, science and technology. Some differences are observed among the different groups due to

the inherent demands of each profession. Research scientists have been found to be more judgmental; creative scientists, highly curious and persistant; architects highly perceptive; writers highly origical and prone to fantasizing; musicians and artists highly emotional, temperamental and bohemian. Surprisingly, these characteristics have been isolated through highly different approaches, utilizing subjective psychoanalytic analyses and objective factor analytic methods. For an extended description of personality traits of creative people refer to the review by Barron and Harrington (1980).

Creativity and Motivational Characteristics

Amabile (1977), attempted to demonstrate the relevancy of an intrinsically motivated state to creative activity. She postulated that an intrinsically motivated state is conducive to creativity, while an extrinsically motivated state is detrimental. Her findings basically supported this hypothesis. Those subjects who received evaluation instruction produced artworks of less creative value than those subjects who did not receive such instructions. An interesting outcome of this study refers to the high creative quality in the artworks of subjects who were instructed on how to be creative. Unfortunately, these subjects were also perceived by qualified judges as displaying lower technical competence. These subjects also were less intrinsically motivated in their work than subjects who performed without external constraints.

Amabile's findings are congruent with previous research on the effects of external evaulation on creativity. Parnes (1963) has studied two well known methods to stimulate creativity: Brainstorming and Synectics. Both of these methods are based on the assumption that evaluation too early in the creative process may inhibit ideas, and that a permissive atmosphere that is free of criticism, will forster the production of more and better ideas.

Other research studies (Parnes & Meadow, 1959, 1960; Torrance, 1965; Taylor, 1975; Stein, 1975) have focused on assessing the type of environments that are most conducive to creative productivity. In synthesis, based on the findings of thesestudies, it is fair to state that, the creative environment is one in which the creative individual is not held back by criticism of unconventional thought or arousal of fear of failure.

Research on personality characteristics sheds some light to the question of how and what motivational aspects of behavior may influence creativity and help explain individual differences in achievement in spite of initial comparable levels of intellectual capacity or manual skill.

Creative individuals are characterized by a greater awareness of and receptiveness to the outer world and inner self (MacKinnon, 1961; Gough, 1961; Barron, 1963a) Creative individuals seem to have a motivational orientation toward self expression (Golann, 1962), freedom from constraints (MacKinnon, 1962), playful involvement with the task

(Taylor, 1962), and nonconforming attitudes (Crutchfield, 1962). Experiencing a lack of freedom of action and restriction from engaging in intrinsically rewarding activities, have been found to be detrimental to creativity (Csikszentmihalyi, 1975).

Maslow's (1959) self-actualizing creativeness and Rogers' (1959) self-satisfaction motives have received some empirical support. Maddi (1965) found a positive relationship between creativity and the need for novelty. The need for novelty is viewed by Maddi as an expression of the general tendency toward self-actualization and the desire to maximize the experiencing of one's own expressive potentials. Houston and Mednick's (1963) findigs are in line with Maddi's formulation. Utilizing a word pairing task, they found that the high creative group chose significantly more number of novel stimuli than the low creative group.

Propst (1962) developed an instrument to measure openness to internal experience through introspection and found a positive relationship between "inner directedness" and a combined score of originality for a sample of 60 male undergraduates.

Creativity and Effectance Motivation. Based on White's concept of competence motivation, risk taking tendencies, due to the need to achieve and to test limits, have also been hypothesized to serve as a motivational drive in creative individuals. Pankove (1967) found a positive

relationship between risk-taking and creativity, in fifth grade boys. Anderson and Cropley (1966) found essentially the same relationship with adult subjects.

The Effects of Material Rewards on Cognitive and Motivational Processes Associated with Creativity

The application of operant techniques to many diverse fields has received increasing researc attention. The basic principles for analysis of behavior by operant techniques were derived primarily from experiments on animals (Hilgard, 1956). However, since the 1950's the principles have found increasing application in analyzing human behavior. Operant techniques have been used in a wide variety of settings to elicit desired behavior. In recent years, operant procedures have been replaced with reward instructions, mainly due to convenience.

Rewards and Regression

The detrimental effect of rewards has been clearly established mainly in tasks requiring highly cognitive processes; however, the effect of material rewards on tasks requiring cognitive as well as associational/affective processes, such as in artistic activity, has not been studied in the past.

In recent years, researchers have suggested a reward induced developmental regression as an alternative explanation for the detrimental effects of material rewards on IQ tests, (Fabes et al., 1981; Moran et al., 1984), inkblots (Fabes et al., In press). and tasks requiring

divergent thinking (McGraw & McCullers, 1979; Moran & Liou, 1982).

Due to the substantial empirical data available supporting the assumption that developmental regression enhances certain forms of creative activity, and due to recent findings linking regressive behaviors to material rewards, the task of the present investigation was to assess the effects of monetary rewards on artistic creativity and to determine if the effects are mediated by a reward induced developmental regression.

Rewards and Associative Thinking Abilities

The investigation by Pryor, Haag and O'Really (1969) with porpoises lend support to the application of operant techniques to the field of creativity. These researchers used shaping procedures in attempting to develop spontaneity and creativity in these animals. At each demonstration the trainers reinforced on a new behavior, only those actions which had not been rewarded before. The porpoises began doing such as tricks as aerial flips, gliding with their tail out of water and skidding on the tank floor. The trainers had never seen a porpoise responding in these ways. It appeared that porpoises had learned that the trainers wanted new acts, not repetitions. Some of the spontaneous acts were so unusual that the trainers could not imagine achieving them with the shaping system.

After training several different porpoises, Pryor et al. (1969), concluded that individual differences in

creativity exist among these animals, some porpoises responses were more spectacular and imaginative than others. She also stated that the ability to produce unusual behavior is not an example of cleverness peculiar to porpoises, and that it should be possible to induce spontaneity and creativity in most members of many species.

The work of Maltzman and his associates (1958, 1960) is the most well known in the training of creativity in young adults within the framework of behavioral theory. Maltzman (1960) operationally defined creativity as "behavior that occurs relatively infrequently, is uncommon under given conditions, and is relevant to those conditions " (p. 1). Maltzman and his associates, were guided by the assumption that creative behavior can be increased by the use of reinforcement through operant conditioning principles. The training procedures were similar to those employed by Pryor, Haag and O'Reailly (1969). Subjects in each training session were allowed to repeatedly evoke different associations to the same stimulus words in a free association situation and received intermittent reinforcement of uncommon responses.

Subjects submitted to these training procedures were found to significantly increase the originality of their associations over control subjects who did not receive such training. The degree of originality varied as a function of the number of repetitions of the training word list. Also, Maltzman et al. (1960) found that subjects undergoing this

training for developing originality performed better in Guilford tests of divergent abilities. These researchers concluded that their training is transferable to other behavioral responses.

Maltzman's research as well as many other studies present convincing evidence of the feasibility to increase "original" associations utilizing material rewards as an incentive.

Operant conditioning methods have successfully increase creativity in preschool children (Rosen, 1980; Ryan & Winston, 1978; Fallow & Goetz, 1975; Goetz & Baer, 1973; Reynolds, 1974; Roger, 19 ; Goetz & Salmonson, 1972); in elementary school children (Chambers, Goldman & Koveski, 1977; Maloney & Hopkins, 1973) in high school students (Mitchell, 1970; Glover & Sautter, 1977; Taylor & Hoedt, 1966); and college students (Locurto & Walsh, 1976; McDonald & Martin, 1967; Maltzman, Bogartz & Breger, 1958). Likewise, operant conditioning methods have successfully increased creativity in a wide range of tasks. Material rewards have increased novelty in blockbuilding behaviors (Goetz & Baer, 1973; Reynolds, 1974; Chambers, Goldman & Kovesky, 1977); novelty in painting (Rosen, 1980; Goetz & Salmonson, 1972); novelty in drawing (Fallon & Goetz, 1975; Ryan & Winston, 1978; Hutchison, 1974; Glover & Sautter, 1977); novelty in writing (Taylor & Hoedt, 1966; Maloney and Hopkins, 1973; Mitchell, 1970); associational novelty (Locurto & Walsh, 1976; Maltzman et al., 1958; McDonald &

Martin, 1967).

In sum, these studies support the idea that reinforcement, tangible or intangible, of new behaviors increases the originality (or creativity) of subjects who have received such reinforcement.

Rewards and Divergent Thinking Abilities

In general, rewards tend to enhance subjects' performance on the wide variety of divergent thinking tests available. However, the effect of material reward on these tests varies somewhat, from one type of test to another; thus, the review of literature on this area will be presented for each test category independently.

The Wallach and Kogan (1965) test of divergent thinking abilities is one category. The Wallach and Kogan tests are designed to evaluate mainly ideational fluency and originality which is the by-product of the number of responses, rather than of the cleverness of the individual. In every instance, regardless of type of reinforcement (Milgram & Feingold, 1977) or reward contingency (Ward, Pankove & Kogan, 1972), and with a wide variety of subjects, with children from low socioeconomic status (Milgram & Feingold, 1977; Ward, Pankove & Kogan, 1972); with learning disabled children (Henson, 1975); and with gifted and normal children (Gallman, 1974), rewards have had an enhancing effect on ideational fluency. That is, rewards tend to increase the number of responses emitted to a given stimulus. These responses being strickly associational in

nature and not related to each other in any logical way.

Other tests of divergent thinking abilities, such as the Guilford tests, the Torrance Tests of Creative Thinking (TTCT) and the Getzel and Jackson tests have operationalized creativity not only as ideational fluency, but include a broader spectrum of divergent thinking abilities, such as fluency, flexibility, originality and elaboration.

Although in the majority of the studies in which creativity has been defined in terms of these four components (fluency, flexibility, originality and elaboration) rewards have generally enhanced performance, a few studies have been able to demonstrate detrimental effects of material rewards on some divergent thinking abilities.

Perhaps one reason why rewards have been found to enhance performance in the Wallach and Kogan tests on one hand, and to have detrimental effects on the Guilford and Guilford like tests on the other, is due to the substantial correlations found between the Guilord tests and standard tests of intelligence. McCullers, (1979) has suggested that material rewards may be detrimental to performance in tasks that require highly cognitive, logical functioning, but may have an enhancing effect on tasks that require associational processes.

Considering the five components of divergent thinking tests, the enhancing effect has been found in individuals varing widely in age. From preschool children (Savoca,

1965) and elementary school children (Johnson, 1974; Kandil, 1980; Glover & Gary, 1976; Bamber, 1974), to high school students (Glover & Sautter, 1977; Metz, 1961; Mendelson, 1973) and college students (Glover, 1980; Halpin & Halpin, 1973; Glover, 1974). This enhancing effect applies to verbal as well as to non-verbal (pictoral or auditory) performance.

A few studies studies report detrimental effects of reward on different divergent thinking subprocesses. Johnson (1974) for example, found that the performance of disadvantaged children was significantly higher under reward conditions, while the performance of the relatively advantaged children was slightly higher under non-reward conditions.

Cox, Nash and Ash (1976), obtained similar results with college students. The offering of extra credit toward the final grade in the course for good performance created a deflation of scores, although non-significant. The subjects in this study were middle class college students, with only a small percentage of the sample coming from minority groups. Socio-economic factors seem to mediate the effects of rewards on divergent thinking test performance.

Moran and Liou (1982) have found that material rewards interact with the intellectual ability of the subjects. Reward subjects of high intellectual ability scored lower on three measures of creativity (fluency, flexibility and originality), as measured by the circles task from the TTCT,

whereas, rewards facilitated performance on these three measures in low intellectual ability students. A similar trend was observed on another nonverbal task (the picture completion task also from the TTCT). Nonreward students scored higher on each of the four component scores (fluency, flexibility, originality and elaboration), although the difference between non-reward and reward subjects was significant only on the flexibility measure.

Rewards and Intrinsic Motivation

The effects of external rewards on intrinsic motivation have been a focal point for a great deal of controversy. The existing evidence seems to indicate that contingent external rewards are associated with a decrease in intrinsic motivation (Deci, 1971, 1972a, 1972b; Greene & Lepper, 1974; Anderson, Manoogian & Reznick, 1976).

The detrimental effects of rewards on behavioiral measures of intrinsic motivation (i.e. the amount of free time spent on a task) have been demonstrated with nursery school children (Greene & Lepper, 1974; Lepper, Greene & Nisbett, 1973; Ross, 1975); with elementary school children (Maehr & Stallings, 1972); with high school students (Kruglanski, Friedman & Zeevi, 1971) ; and, with college students (Benware & Deci, 1975; Deci, 1972a, 1972b; Deci, Benware & Landry, 1974; Deci, Cascio & Krussel, 1975). Calder and Staw (1975), Kruglanski et al. (1975), Pritchard, Campbell and Campbell (1977) demonstrated that attitudinal measures on intrinsic motivation, such as ratings of

interest and liking for a task, could be used with similar results.

The effects of rewards on intrinsic motivation do not seems to be simple and straight forward. On the contrary, researchers have identified a number of variables that seem to mediate the effects of rewards on intrinsic motivation.

Individual differences that have been found to be related to the detrimental effect of rewards include: sex of subjects (Deci, 1972); initial interest level (Lepper et al., 1973), initial level of intellectual capacity (Moran, 1978) and initial perceived competence level (Harter, 19).

Tasks differences also have been found to be related to the detrimental effects of reward upon subsequent intrinsic motivation. Calder and Staw (1975) demonstrated that although monetary rewards tend to decrease intrinsic motivation on interesting tasks, rewards may actually increase intrinsic motivation on boring tasks. Kruglanski et al.(1975) found that if the reward is perceived as an integral part of the task itself (e.g., a game such as poker), the reward may lead to an increase on one's intrinsic motivation.

Daniel and Esser (1980) studied the effects of material rewards on tasks of high and low structure. They found that rewards enhanced intrinsic motivation for high structured tasks, but undermined intrinsic interest in low structured tasks.

Rewards and Effectance Motivation. White (1959) introduced the concept of effectance motivation to denote the intrinsic tendency of the human organism to strive towards competence or mastery of the environment.

In an intrinsically motivated state an individual enjoys challenging tasks; that is, tasks that are not too easy, but require ingenious, flexible risk-taking behaviors.

External constraints have been found to have an adverse effect on effectance motivation. Pearlman (1979) found that students who feared punishment chose much easier math problems to solve, while control subjects continued to choose progressively harder math problems. Similarly, Fabes (1982) found that rewards affected primarily subjects who did not perceived themselves competent in cognitive abilities. These subjects completed less number of items, and attempted to solve easier rather than harder problems.

Rewards and Task Performance

The type of task have been found to mediate the detrimental effects of rewards not only on intrinsic motivation but on task performance as well. McGraw (1978) has addressed to the task variable in attempting to explain the detrimental effects of rewards on performance. He proposed a two factor model (Attractive-Unattractive and Heuristic-Algorithmic) through which the detrimental effect of rewards is predicted only on tasks that are initially attractive and require heuristic, divergent solutions. On all other combinations of the two factors, the model

predicts that rewards should enhance performance.

There exists some support for McGraw's model. McGraw and McCullers (1979) obtained clear evidence of the detrimental effect of rewards on tasks that require insightful, creative solutions. Fabes et al. (1981) demonstrated that rewards had a detrimental effect on subtests of the Adult Wechsler Intelligence Scale which required heuristic solutions but no such effects were obtained in subtests which required rote-algorithmic type solutions.

Rewards and Problem Solving. The most thorough investigation on the effects of rewards on tasks requiring restructuring and divergent production has been performed by McGraw and McCullers (1979). Based on previous findings on the detrimental effect of rewards on performance (see reviews by Condry, 1977; Levine & Fasnacht, 1974; McGraw, 1978), these researchers hypothesized that rewards may have a detrimental effect on tasks requiring set-breaking abilities. In order to test this hypothesis they performed a series of investigations using Lunchins' (1942) water jar problems. The purpose of the water-jar problems was to establish a mental set for indirect, 3-jar solutions. Then the influence of this mental set on behavior was studied by introducing problems which had simpler non-set solutions. The results of these studies supported the initial hypothesis. Reward subjects took longer than nonreward subjects to solve the non-set problem. Furthermore, reward

subjects made significantly more errors than nonreward subjects. An additional finding of these studies relates to the lack of relationship between motivation and task performance. Interest in the activity did not change in spite of clear detrimental changes in performance. Also, rewards did not produce a decrease in intrinsic motivation in reward subjects as existing hypothesis from socio-cognitive psychology would have predicted.

Alternative Explanations for the Detrimental Effect of Reward

Early theoretical works have attempted to explain the detrimental effect of reward based on cognitive and motivational processes (DeCharms, 1968; Deci, 1975; Kruglanski, 1975; Lepper, Greene & Nisbett, 1973). For recent reviews on these theories see Bates (1979), de Charms & Muir (1978) and Lepper & Greene (1978a).

These theories have been found however to be incomplete or inadequate when extended to explain the detrimental effects of rewards on task performance (Lepper & Greene, 1978b).

Some researchers have suggested (Deci, 1975; Fabes,1982; Feingold & Mahoney, 1975; Lepper & Greene, 1978b) that performance and motivation may be governed different mechanisms. This assertion has received some empirical support by studies in which rewards decreased intrinsic motivation but did not affect task performance (Deci et al., 1975; Dollinger & Thelen, 1978; Ross, Karniol

& Rothstein, 1976). It has also been found that rewards may have a detrimental effect on task performance but may not decrease subsequent intrinsic motivation for performing that task again (McGraw & McCullers, 1979; McCullers, Fabes, & Moran, 1981; Harackiewicz, 1979).

Fabes, McCullers & Moran (1981) have postulated an alternative theoretical explanation in accounting for the detrimental effects of reward on task performance. They suggest that rewards may unconsciously affect the cognitive functioning, perceptual organization and general maturity level with which the subject approaches the task; thus, producing a temporary developmental regression.

Some initial support for this developmental regression hypothesis has been obtained with inkblots (Fabes, McCullers and Moran, In press), with tests of intelligence (Fabes, McCullers & Moran, 1981; Moran, McCullers & Fabes, 1984), and with human figure drawings (McCullers, Fabes, & Moran, 1981).

The detrimental effect of rewards within the context of the developmental regression hypothesis has mainly been assessed using tasks that require highly cognitive processes. In the present study, the authors attempt to look at a task that requires both cognitive as well as associational and affective processes.

The theoretical rationale for considering this parameter in the study of the effects of rewards on task performance stems from the independent work of Paul MacLean,

a medical researcher.

MacLean (1973) has postulated that the human brain is composed of three evolutionary distinct structures. The oldest structure is the so-called reptilian brain, the next oldest structure is the paleo-mammalian brain or lymbic system and the most recent structure is the neo-mammalian brain or cerebral cortex.

Through numerous and involved experiments, MacLean (1963; 1970) has observed that although each of these brain structures has unique phisiological properties and specialized bevioral functions, there exists an ongoing interaction among these structures (brains), influencing and altering their specialized functioning. MacLean argues that any highly cognitive activity involves more than just logical processes. He says emotions tint reality and disrupt pure logical thinking.

In MacLean's triune brain model, the center of emotional, affective behavior is the paleo-mammalian brain or lymbic system which is an evolutionary more primitive structure than the cerebral cortex. Based on MacLean's work on brain functioning, McCullers (Note 2) has proposed that if rewards function as stimulants for the activation of altered affective states, then rewards could be said to induce a primitivization in functioning, by arousing emotions and thus disrupting highly cognitive functioning.

In tasks that require highly cognitive functioning, the offering of reward would clearly be detrimental with

consequent adverse effects on performance. However, on tasks in which mainly affective processes are required, the offering of rewards may not necessarily be detrimental and perhaps would even be desirable.

In the present study, rewards were offered to subjects performing in an artistic activity. If regression is a prerequisite for successful performance in this art activity, as it is suggested by several theorists, then rewards may enchance artistic performnce by arousing emotions and affects in the individual.

Measurement of Creativity

Available knowledge of the creative process has not given researchers sound bases for determing the best methods in the assessment of creativity.

One of the continuing challenges of researchers in creativity is to find and to develop functional criteria of creativity and the process of creating. The very nature of creativity, in general, and of artistic creativity in particular has deterred empirical study.

Over the years, nonetheless, a body of scientific literature on creativity has emerged which points out three major ways of measuring creativity: 1) relying on subjective judgments of creative (scientific or artistic) products or ideas; 2) through projective techniques; and, 3) utilizing objective tests of creativity and divergent thinking abilities.

Subjective Ratings

All methods of assessment of creativity are plagued with conceptual and methodological drawbacks, this is an intricate problem associated with creativity research. The basis for choosing one form of measurement over another depends mainly on the appropriateness of the assessment technique for measuring what needs to be measured. This research used judgments of creativity in art as the criterion of creativity. The art activity chosen for this research was a collage type activity which was developed and tested by Amabile (1977).

The Holtzman Inkblot Technique

Another purpose of this study, besides assessing the effects of rewards on artistic creativity was to attempt to validate the developmental regression hypothesis as an alternative explanation for the detrimental effects of rewards.

In the present study, the Holtzman Inblot Technique (HIT) was used to assess perceptual organization and maturity. The HIT is an standardized instrument, sensitive to developmental differences. The HIT has been found to be related to intellectual-cognitive functioning and provides a means of evaluating cognitive processes. For a summary of previous correlational studies of the HIT with several tests of intelligence see Holtzman (1968). The HIT has also been found to be sensitive to developmental differences in perceptual organization. For further reference on

developmental changes in inkblot perception see Werner (1957), Friedman (1952), Phillips and Framo (1954), Siegel (1950).

The HIT in addition, provides measurement of psychopathological thinking. Bizarre emotional states have been found to be inversely related to high conceptual differentiation (Holtzman, 1968), but positively related with creative potential (Richtey & Winter, 1966) and divergent thinking ability (Clark, Veldman & Thorpe, 1965).

Finally, some other HIT variables, besides Pathognomic Verbalization, like Movement, Color and Location, have traiditionally been linked with creative productivity.

In sum, the HIT offers a unique opportunity to not only assess developmental differences, but also to assess creative potential.

Group and Individual Methods of Administration. Although the HIT was originally administered on an individual basis, it appears to be easily adaptable for group administration. In studying the comparability of group and individual HIT administrations, Holtzman et al. (1963) has concluded that the group method can be substituted for the individual administration.

Subsequent research (Swartz & Holtzman, 1963) comparing individual and group methods reported similar split-half reliabilities between group administration and the standardized individual method. Intra-subject stability, derived through test-retest reliability coefficients, was

also similar to the individual data.

Certain modifications have been made before the HIT could be employed in group situations. First, trial blots must be projected on a screen in order to demonstrate the use of locations and determinants, such as form, color and shading in influencing a response. According to Holtzman, Thorpe, Swartz and Herron (1961), this is needed to compensate for loss of individual rapport between examiner and examinee.

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APPENDIX B

TABLES

TABLE I

INTERJUDGE RELIABILITIES FOR FOUR JUDGES

Dimension of Judgment	Reliabililty	
	Session I	Session II
Creativity	.52**	.54**
Craftsmanship	.59**	.28
Aesthetic Value	.43*	.49*
Maturity	.52**	.43*
Overall Rating	.55**	.42*

*p = < .05
**p = < .01
***p = < .001

TABLE II

SESSION I: BASELINE MEASURES, AVERAGE JUDGE RATINGS

Subjective Artistic Dimensions	Conditions 1 & 2 (23) (Nonreward Group in Session II)		Conditions 3 & 4 (28) (Reward Group in Session II)	
	Mean	Strd.Dev.	Mean	Strd. Dev.
Creativity	17.75	5.46	16.86	4.79
Craftsmanship	20.47	4.12	19.79	4.43
Aesthetic Value	16.64	4.07	17.42	4.70
Maturity	18.79	4.45	18.98	5.31
Overall Rating	17.96	4.90	17.56	4.79

Note: Differences between reward/nonreward conditions were nonsignificant ($F = > .05$).
(Means on a 40-Point Scale)

TABLE III

SESSION II: AVERAGE JUDGE RATINGS FOR REWARD AND NONREWARD CONDITIONS

Subjective Artistic Dimension	Conditions 1 & 2 (23) (Nonreward Group)		Conditions 3 & 4 (28) (Reward Group)	
	Mean	Strd.Dev.	Mean	Stdr. Dev.
Creativity	16.18	5.16	17.63	5.14
Craftsmanship	20.00	3.09	20.45	3.83
Aesthetic Value	16.59	3.95	16.97	4.66
Maturity	18.00	4.39	19.13	4.32
Overall Rating	17.37	3.91	17.76	4.49

Note: Differences between reward/nonreward conditions were nonsignificant ($F = > .05$).
(Means on a 40-Point Scale)

TABLE IV

SESSION I: BASELINE MEASURES, OBJECTIVE RATINGS

Objective Dimensions	Conditions 1 & 2 (23) (Non-reward Group in Session II)		Conditions 3 & 4 (28) (Reward Group in Session II)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
No. pieces used	49.39	19.20	61.00	29.98
No. colors used	9.08	1.34	9.21	1.66
No. 3-D pieces	3.30	4.70	.53	1.80
No. pieces altered	3.21	4.65	5.96	26.36
No. Global-Shape Category	5.08	1.16	5.46	.92
No. Indiv.-Shape Category	8.73	1.93	9.10	1.89
Percent of Area Covered	73.60	19.32	74.46	14.16

Note: Differences between reward/nonreward conditions were nonsignificant ($F = > .05$).

TABLE V

SESSION II: OBJECTIVE RATINGS FOR REWARD AND NONREWARD CONDITIONS

Objective Measures	Conditions 1 & 2 (23) (Nonreward Group)		Conditions 3 & 4 (28) (Reward Group)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
No. pieces used	52.08	20.36	52.35	24.61
No. colors used	9.13	1.68	9.25	1.34
No. 3-D pieces	3.08	6.18	2.14	7.37
No. pieces altered	3.26	6.26	1.17	2.95
No. Global-Shape Category	5.04	1.18	5.46	1.10
No. Indiv.-Shape Category	8.69	1.79	8.71	1.88
Percent of Area Covered	76.73	11.54	78.39	15.27

Note: Differences between conditions were nonsignificant ($p = > .05$).

TABLE VI

PEARSON CORRELATIONS BETWEEN OBJECTIVE RATINGS AND SUBJECTIVE RATINGS OF CREATIVITY AND CRAFTSMANSHIP

	Session I (23) (Baseline Measures)		Session II (28) Reward/Nonreward Measures)	
	Creativity	Craftsmanship	Creativity	Craftsmanship
No. pieces used	.25 (.07)	-.05 (.38)	.52*** (.0001)	.17 (.16)
No. colors used	-.18 (.14)	-.06 (.35)	-.20 (.11)	-.17 (.16)
No. 3-D pieces	.39** (.01)	-.13 (.21)	.38** (.01)	-.30** (.03)
No. pieces altered	-.005 (.45)	-.29** (.04)	.28* (.04)	-.25 (.07)
No. Global-Shape Category	.19 (.12)	.08 (.30)	-.02 (.45)	-.25 (.07)
No. Indiv.-Shape Category	.19 (.13)	.17 (.15)	.38** (.01)	-.14 (.19)
Percent of Area Covered	.32* (.02)	.28* (.04)	.35** (.01)	.27 (.05)

*p = < .05
**p = < .01
***p = < .001

TABLE VII

SESSION I: BASELINE MEASURES,
QUESTIONNAIRE SELF REPORTS

Questionnaire Items*	Conditions 1 & 2 (23) (Nonreward Group in Session II)		Conditions 3 & 4 (28) (Reward Group in Session II)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Item 1 (reversed	3.23	1.97	3.16	1.60
Item 2	5.69	1.77	5.28	1.67
Item 3 (reversed	3.58	1.87	4.18	1.89
Item 4	5.61	1.83	6.22	.95
Item 5	4.83	2.00	5.41	1.52
Item 6	4.90	1.41	5.39	1.07
Item 7	3.21	1.49	2.97	1.29
Item 8	6.04	1.08	6.28	.71
Item 9	4.97	1.56	5.19	1.03
Item 10	3.96	1.56	4.51	.56
Item 11	6.00	1.80	5.89	1.66
Item 12	3.87	1.85	4.68	1.34

*p = < .05
**p = < .01
***p = < .001

* For further information on each item of the Questionnaire refer to Appendix B.
(Means on a 7-Point Scale)

TABLE VIII

SESSION II: QUESTIONNAIRE SELF REPORTS FOR REWARD AND NONREWARD CONDITIONS

Questionnaire Items	Conditions 1 & 2 (23) (Nonreward Group)		Conditions 3 & 4 (28) (Reward Group)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Item 1 (reversed)	3.44	1.59	3.70	1.02
Item 2	4.91	2.27	5.33	1.68
Item 3 (reversed)	2.61	2.10	4.10	1.98*
Item 4	5.34	1.69	5.70	1.57
Item 5	3.86	1.86	5.20	1.38*
Item 6	4.34	1.61	5.07	1.36*
Item 7	3.86	1.35	3.36	1.79
Item 8	5.43	1.37	6.23	1.04*
Item 9	4.78	1.24	5.13	1.10
Item 10	3.59	1.99	4.17	1.66
Item 11	5.91	1.50	6.10	1.82
Item 12	2.79	2.55	4.70	1.66*

* For further information questionnaire items refer to Appendix F.
(Means on a 7-Point Scale)

TABLE IX

NAME, ABBREVIATION, AND THEORETICAL RANGE OF TOTAL SCORE FOR EACH HIT VARIABLE

Variable Name	Abreviation	Theoretical Score Range
Rejection	R	0-45
Location *	L	0-180
Space	S	0-45
Form Definetness *	FD	0-90
Form Appropriateness *	FA	0-135
Color *	C	0-90
Shading *	Sh	0-180
Movement *	M	0-180
Pathognomic Verbalization *	PV	0-45
Integration *	I	0-45
Human *	H	0-45
Animal *	A	0-45
Anatomy *	At	0-90
Sex *	Sx	0-90
Abstract *	Ab	0-90
Anxiety *	Ax	0-90
Hostility *	Hs	0-135
Barrier *	Br	0-45
Penetration *	Pn	0-45
Balance	B	0-45
Popular *	P	0-25

* Targeted Variables

TABLE X

SESSION I: FIRST TIME REWARDED, HIT MEAN SCORES FOR REWARD AND NONREWARD CONDITIONS ON INDIVIDUAL HIT VARIABLES

Variable Name	Nonreward (31)		Reward (23)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Rejection (R)	3.09	6.24	.91	3.16*
Location (L)	22.22	10.13	18.47	10.42*
Space (S)	.74	.89	.30	.63**
Form Definetness (FD)	86.29	13.60	88.21	12.42
Form Appropriateness (FA)	38.29	4.60	37.00	5.51
Color (C)	16.19	8.95	14.39	7.77
Shading (Sh)	6.06	5.93	6.04	8.62
Movement (M)	31.71	11.08	42.43	11.58***
Pathognomic Verbalization (PV)	5.58	4.89	12.52	9.46***
Integration (I)	5.90	2.24	6.95	3.14*
Human (H)	24.96	7.81	28.95	7.32
Animal (A)	20.48	7.96	22.73	6.63
Anatomy (At)	2.67	2.12	2.95	2.40
Sex (Sx)	.54	1.17	.91	1.41
Abstract (Ab)	1.41	5.73	.78	2.73
Anxiety (Ax)	9.87	7.24	10.65	5.37
Hostility (Hs)	11.74	5.16	12.26	6.98
Barrier (Br)	8.22	3.79	8.43	3.71
Penetration (Pn)	3.83	2.58	3.78	2.13
Balance (B)	.19	.54	.21	.51
Popular (P)	9.54	2.94	10.78	2.59*

*p = < .05
**p = < .01
***p = < .001

TABLE XI

SESSION I: HIT MEAN COMPOSITE SCORES FOR REWARD AND NONREWARD CONDITIONS

Variable Name	Nonreward (31)		Reward (24)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Factor I	158.42	7.48	177.35	12.35***
Factor II	115.97	5.19	112.87	6.12
Factor III	58.90	5.46	77.87	10.02***
Creativity Composite Score	141.13	7.30	155.04	9.65*
Developmental Composite Score	451.61	8.79	463.00	15.43*

*p = < .05
**p = < .01
***p = < .001

TABLE XII

SESSION II: SECOND AND THIRD TIME REWARDED, HIT MEAN SCORES FOR REWARD AND NONREWARD CONDITIONS ON INDIVIDUAL HIT VARIABLES

Variable Name	Non-reward (31)		Reward (23)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Rejection (R)	1.61	4.12	.08	.28
Location (L)	19.69	11.95	20.19	12.03
Space (S)	1.03	1.04	1.08	.73
Form Definetness (FD)	84.90	14.99	86.65	12.12
Form Appropriateness (FA)	39.58	5.43	39.21	4.88
Color (C)	22.35	8.95	26.91	9.14
Shading (Sh)	7.12	5.54	11.65	10.15
Movement (M)	40.58	13.84	45.26	19.13
Pathognomic Verbalization (PV)	6.16	5.52	6.56	5.44
Integration (I)	5.03	2.33	5.73	3.57
Human (H)	24.77	10.97	26.00	7.00
Animal (A)	24.58	8.53	28.08	7.73
Anatomy (At)	2.90	2.34	1.86	2.11
Sex (Sx)	1.80	1.20	.08	.28**
Abstract (Ab)	.22	.80	.39	.78
Anxiety (Ax)	16.96	8.37	16.56	7.30
Hostility (Hs)	13.96	6.00	15.00	7.64
Barrier (Br)	9.51	3.18	10.30	3.94
Penetration (Pn)	2.45	1.91	4.04	2.36
Balance (B)	.06	.35	.04	.20
Popular (P)	8.90	3.46	9.78	2.33

*p = < .05
**p = < .01
***p = < .001

TABLE XV

SESSION II: MEAN HIT SCORES AND STANDARD DEVIATIONS OF MALE SUBJECTS BY CONDITION

Variable Name	Nonreward (10)		Reward (5)	
	Mean	Strd.Dev.	Mean	Strd.Dev.
Rejection (R)	5.30	9.31	0	0
Location (L)	22.10	9.15	14.40	10.01
Space (S)	.60	.51	.40	.89
Form Definetness (FD)	83.80	10.10	89.40	12.21
Form Appropriateness (FA)	39.40	4.62	31.00	3.24***
Color (C)	13.20	8.65	14.40	9.39
Shading (Sh)	6.60	6.22	1.60	2.19*
Movement (M)	27.20	7.42	48.80	10.98***
Pathognomic Verbalization (PV)	4.00	3.23	19.00	14.00***
Integration (I)	4.40	2.11	6.20	1.64
Human (H)	24.00	8.20	34.00	9.19**
Animal (A)	17.30	8.60	20.80	6.30
Anatomy (At)	3.20	2.20	3.80	1.92
Sex (Sx)	.10	.31	1.80	1.78**
Abstract (Ab)	.40	.84	2.60	5.81
Anxiety (Ax)	8.00	4.98	15.60	5.07**
Hostility (Hs)	9.70	3.77	20.20	6.05***
Barrier (Br)	8.10	3.54	8.80	4.20
Penetration (Pn)	5.00	2.66	3.40	1.14
Balance (B)	0	0	0	0
Popular (P)	8.90	2.84	10.40	2.40

*p = < .05
**p = < .01
***p = < .001

TABLE XVI

SESSION I AND SESSION II: CORRELATIONS OF SUBJECTIVE RATINGS OF CREATIVITY AND CRAFTSMANSHIP AND SELECTED HIT VARIABLES

	Session I		Session II	
	Creativity	Craftsmanship	Creativity	Craftsmanship
CC Score	.23 (.08)	.006 (.48)	.14 (.20)	-.18 (.14)
Factor I	.24 (.08)	.10 (.26)	.11 (.25)	.08 (.30)
Factor II	-.09 (.30)	-.11 (.25)	.13 (.21)	-.03 (.41)
Factor III	.22 (.09)	.0001 (.50)	.007 (.48)	-.17 (.15)

*p = < .05
**p = < .01
***p = < .001

APPENDIX C

FIGURES

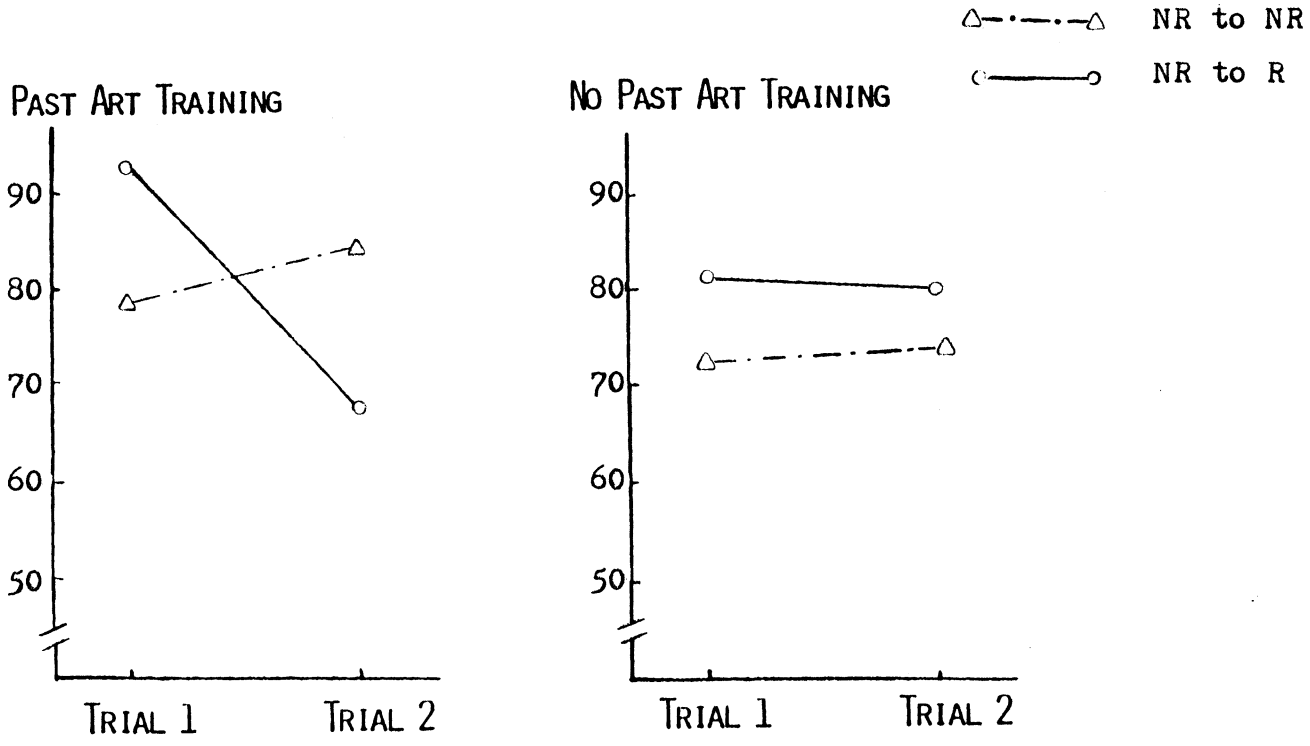

Figure 6. Objective Scores on Number of Pieces Altered of Reward and Nonreward Subjects and Previous Training in Art

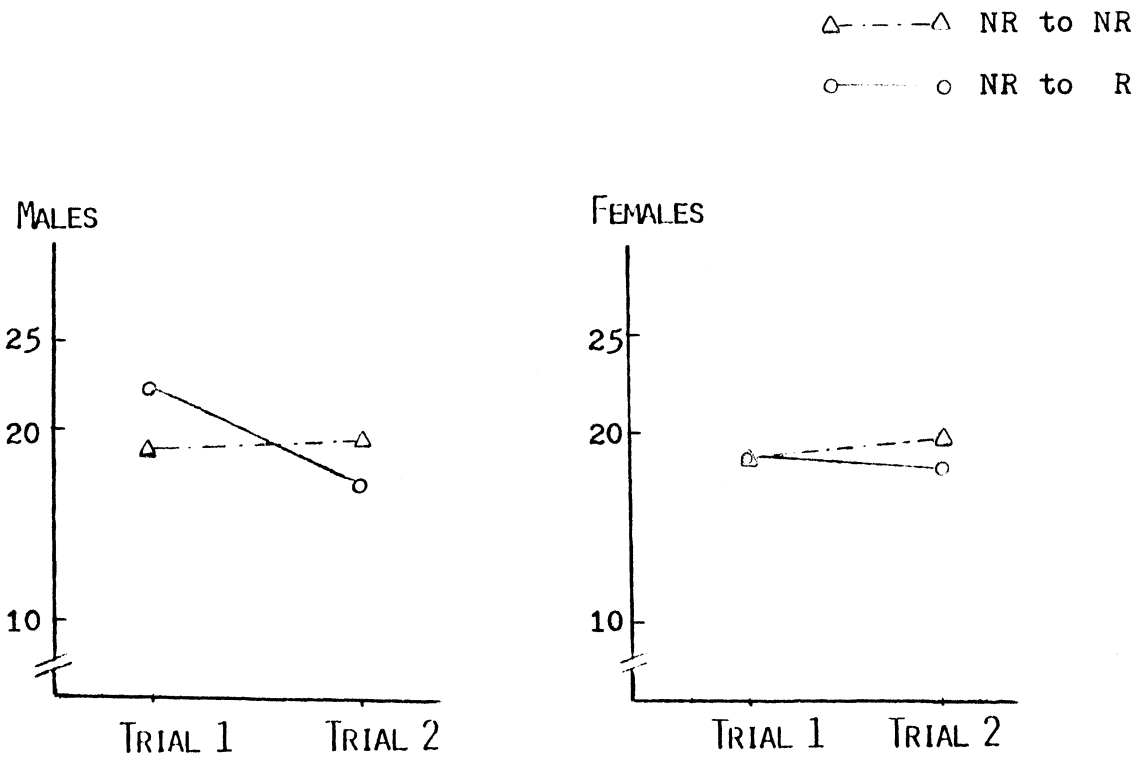

Figure 1. Subjective Rating Scores on Craftsmanship of Reward and Nonreward Male and Female Subjects

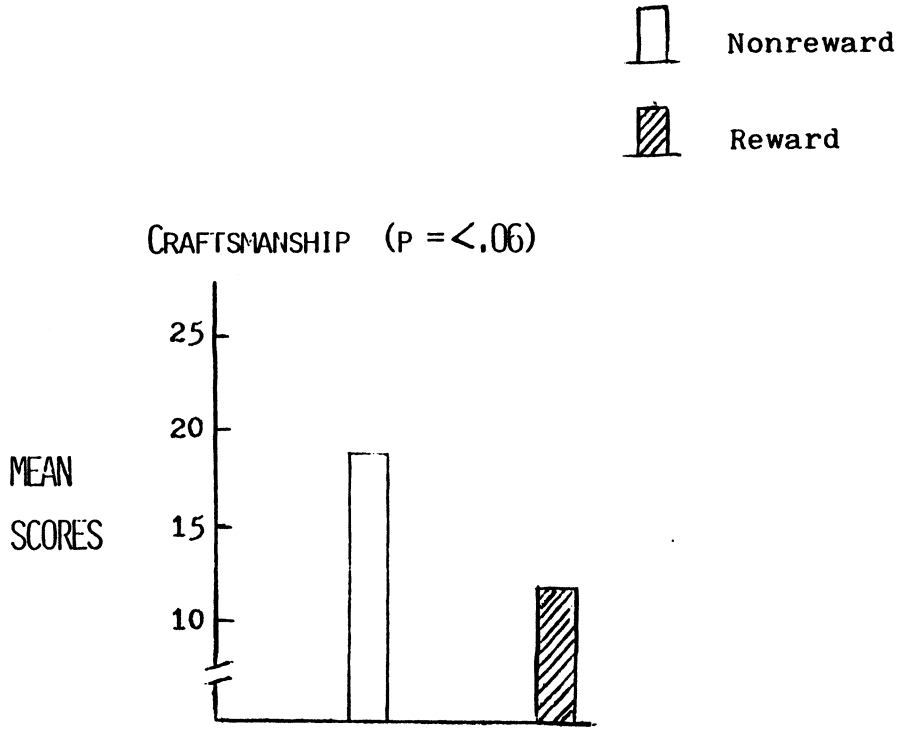

Figure 2. Subjective Rating Scores on Craftsmanship of Reward and Nonreward Subjects who had previous training in art

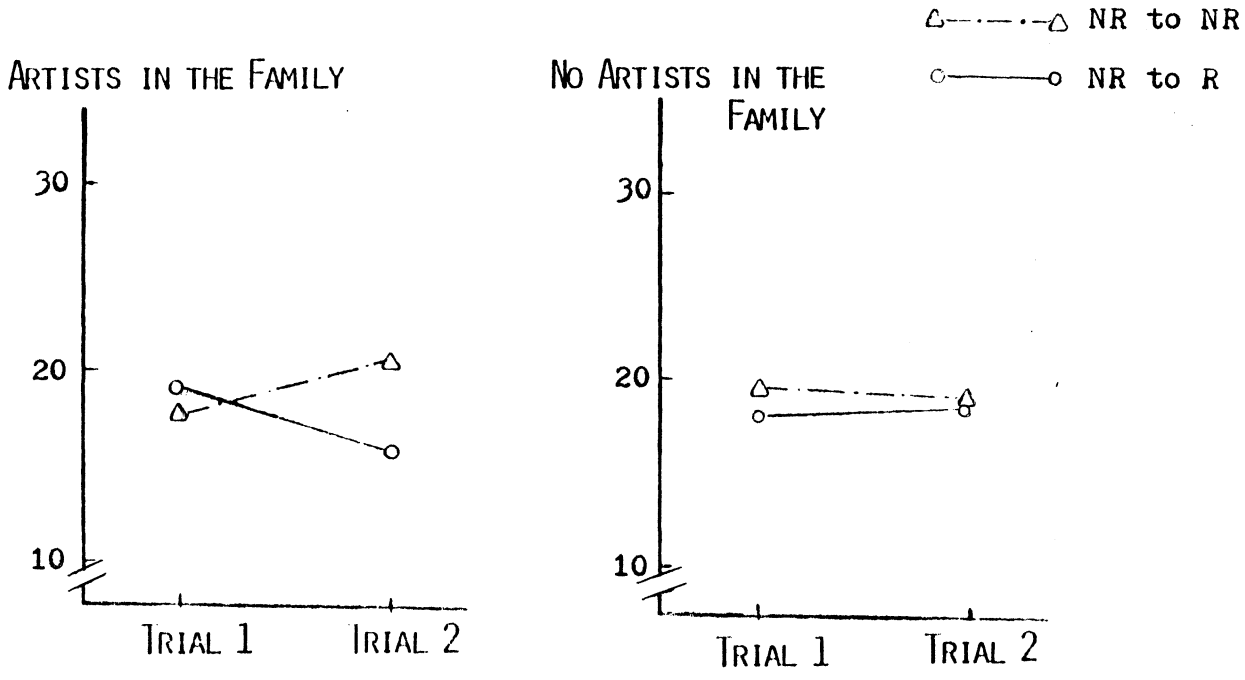

Figure 3. Subjective Rating Scores on Craftsmanship of Reward and Nonreward Subjects and Artists in the Family

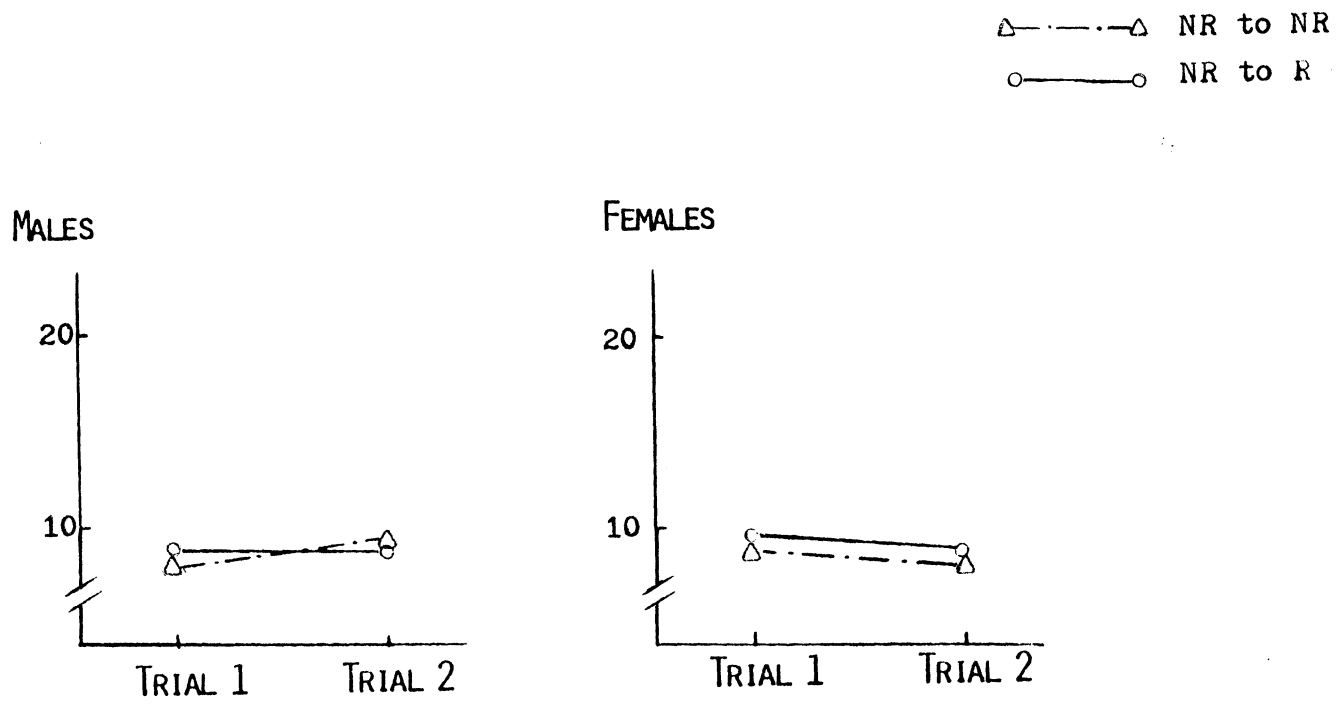

Figure 4. Objective Scores on Percentage of Area Covered by Designs of Reward and Nonreward Subjects and Sex of Subjects

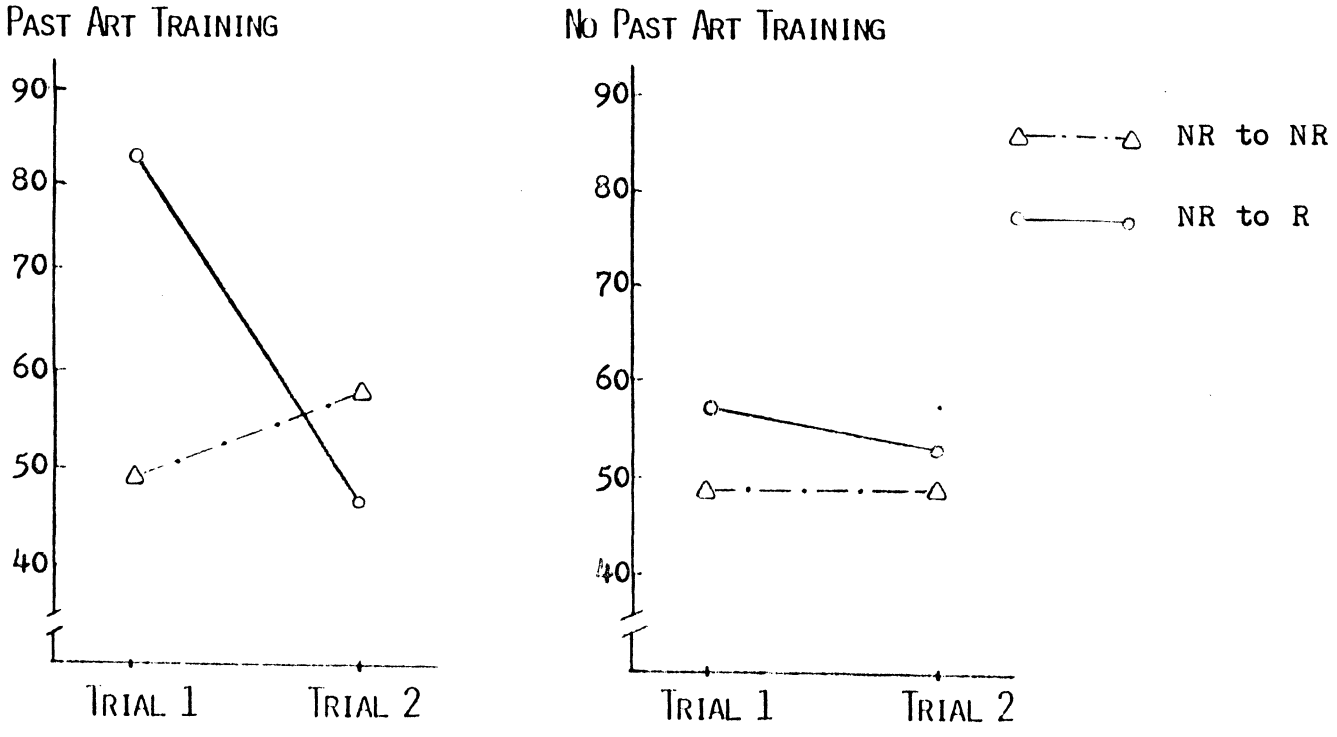

Figure 5. Objective Scores on Number of Pieces Used of Reward and Nonreward Subjects and Previous Training in Art

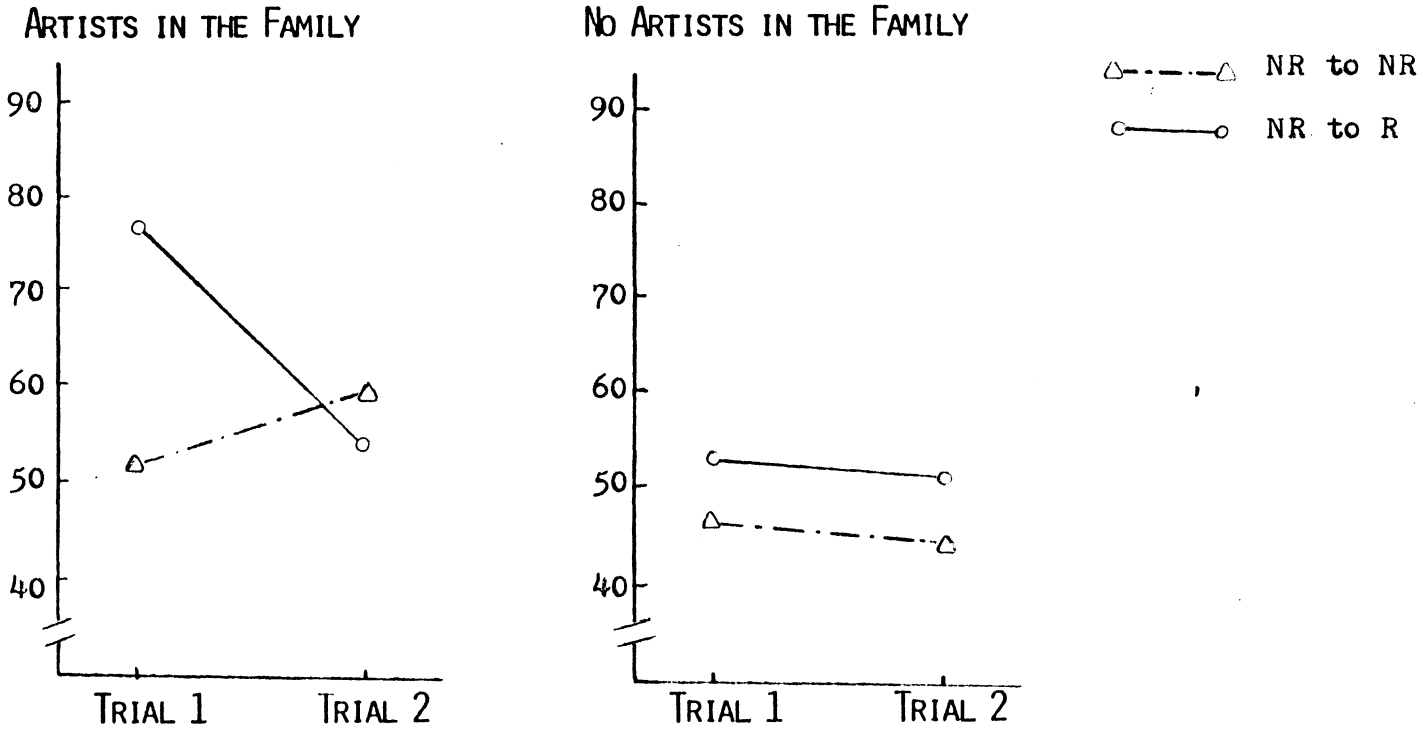

Figure 7. Objective Scores on Number of Pieces Used of Reward and Nonreward Subjects and Artists in the Family

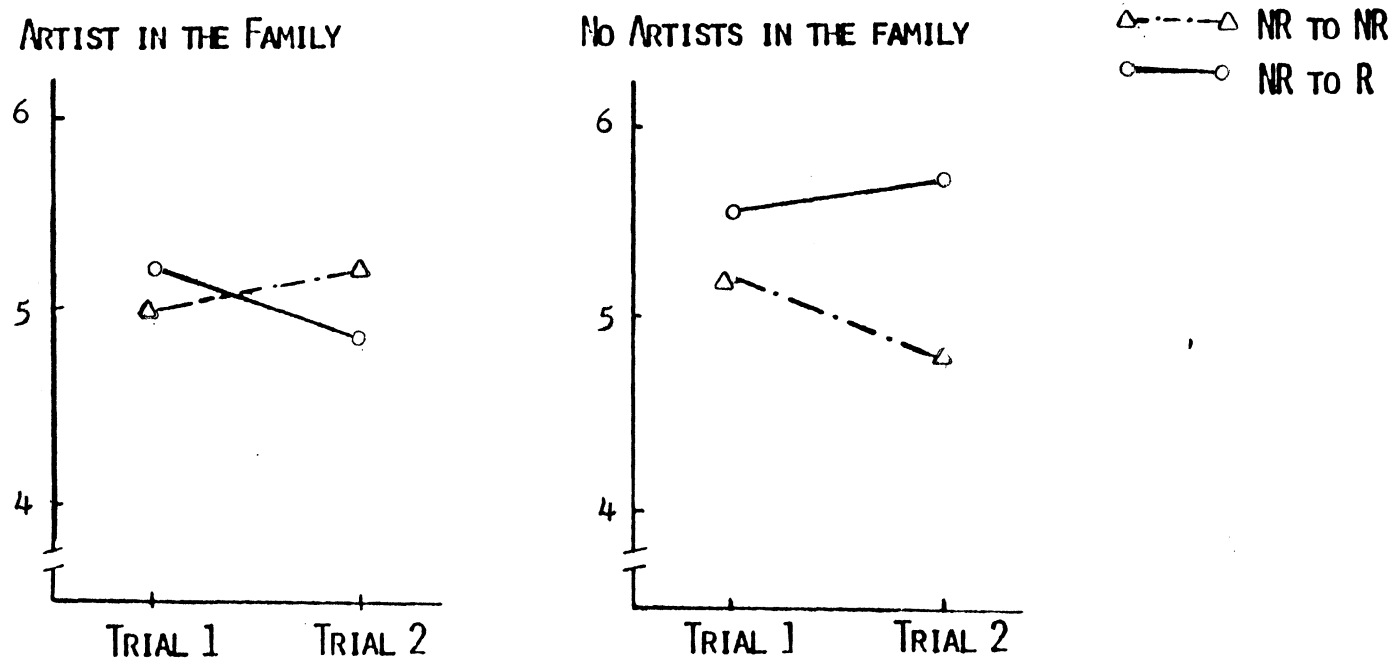

Figure 8. Objective Scores on Number of Global Shape Categories Used of Reward and Nonreward Subjects and Artists in the Family

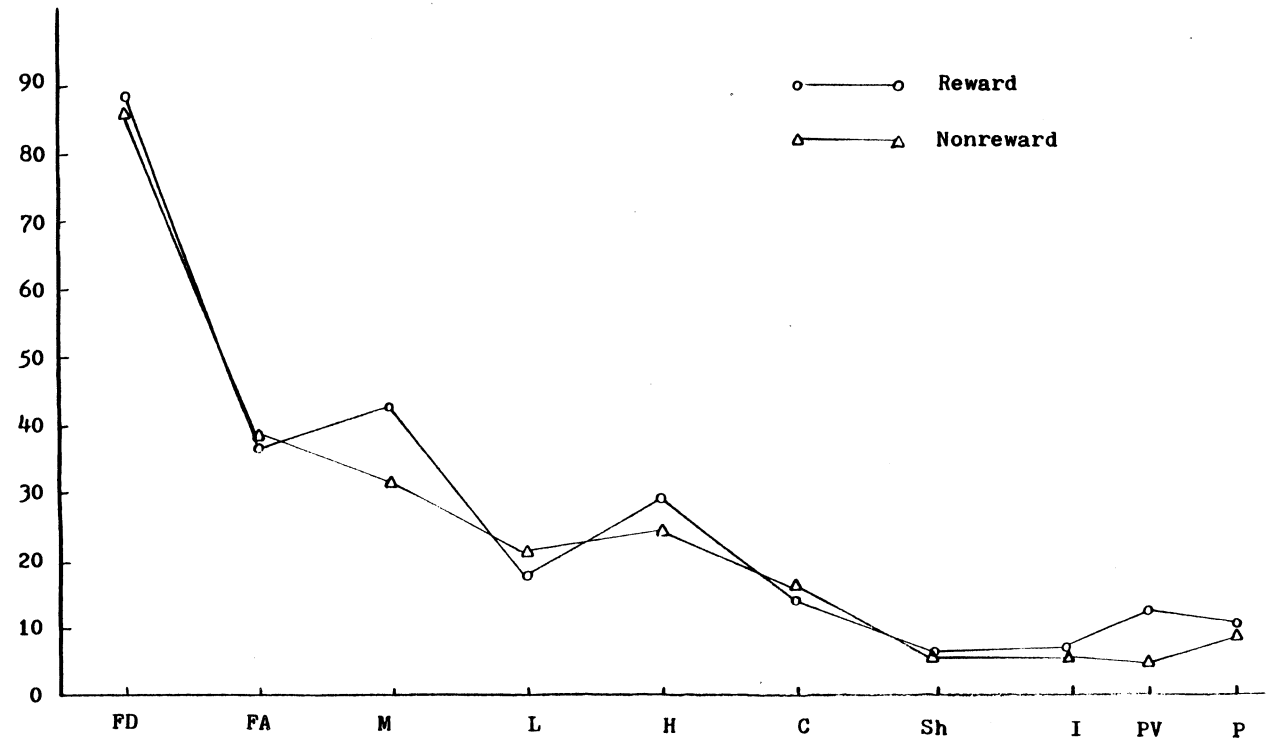

Figure 9. Session I: Factor I HIT Mean Raw Scores for Reward and Nonreward Groups

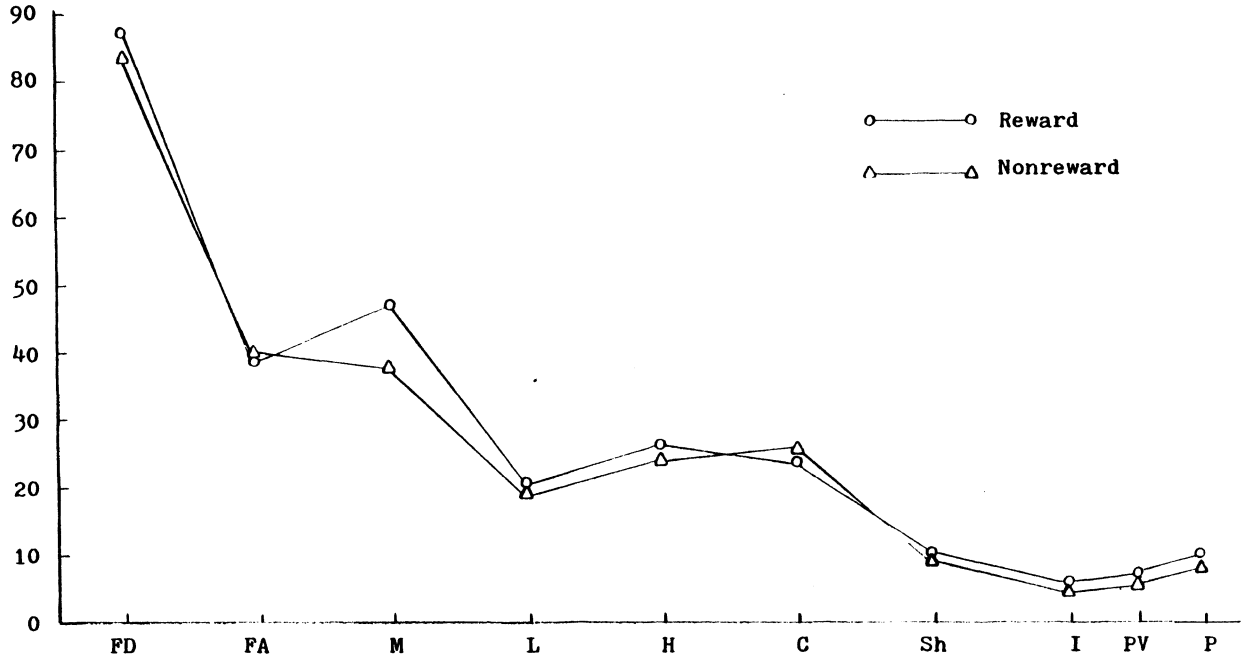

Figure 10. Session II: Factor I HIT Mean Raw Scores for Reward and Nonreward Groups

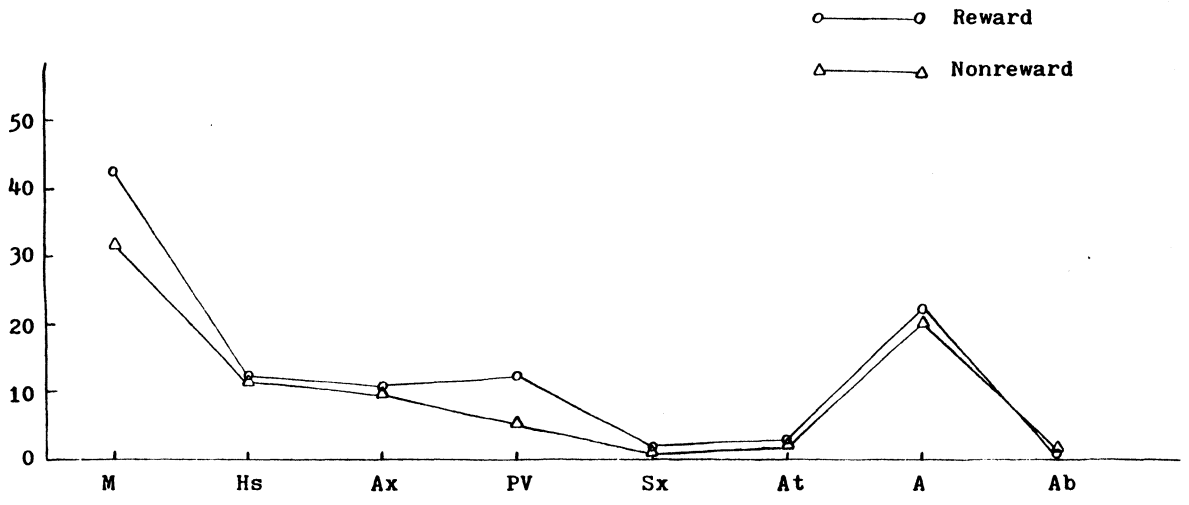

Figure 11. Session I: Factor III HIT Mean Raw Scores for Reward and Nonreward Groups

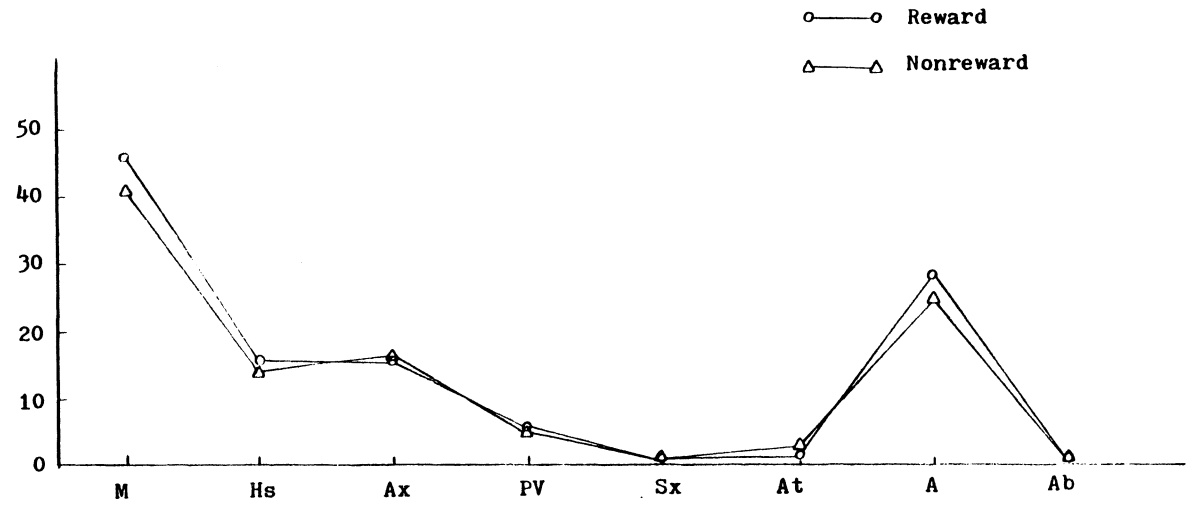

Figure 12. Session II: Factor III HIT Raw Mean Scores for Reward and Nonreward Groups

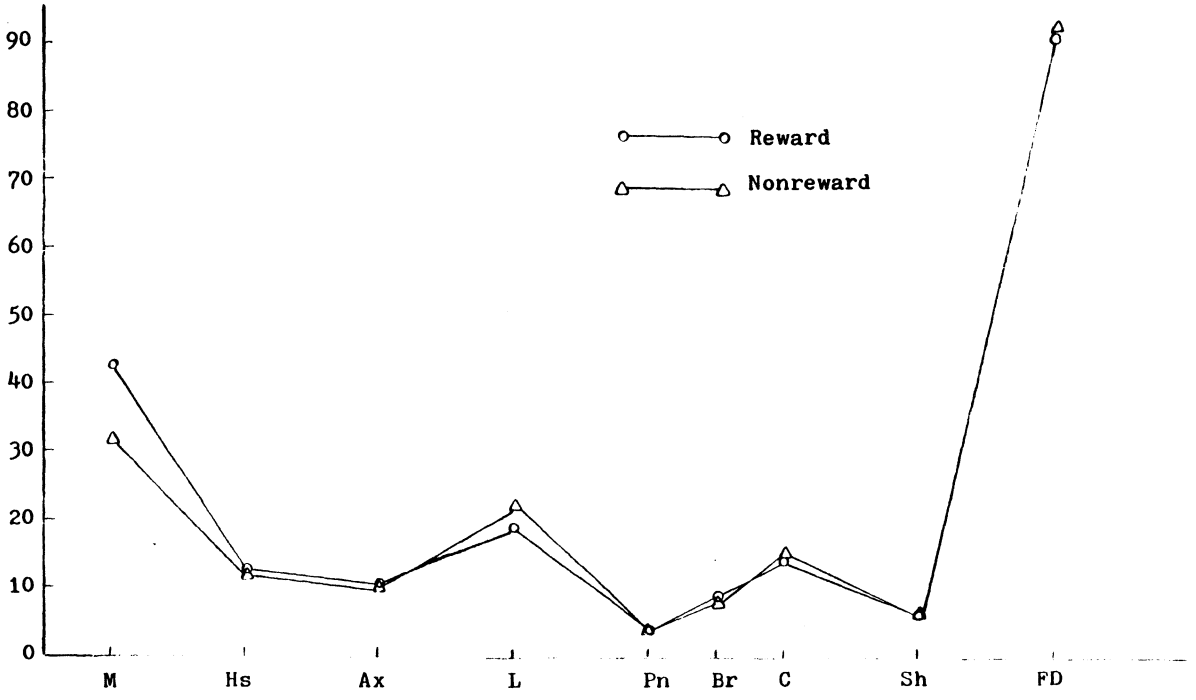

Figure 13. Session I: Composite Creativity HIT Raw Mean Scores for Reward and Nonreward Groups

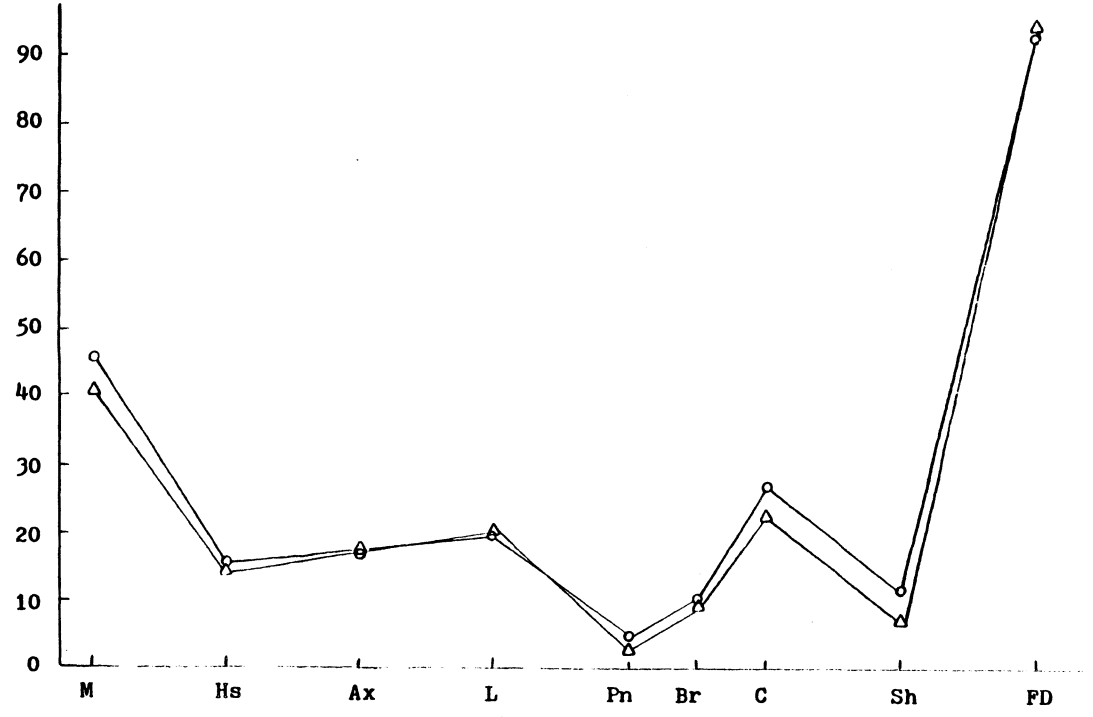

Figure 14. Session II: Composite Creativity HIT Raw Mean Scores for Reward and Nonreward Groups

APPENDIX D

THE RESEARCH DESIGN

The Research Design

		Session I		Session II	
		Art Activity/	HIT	Art Activity/	HIT
Treatment Group	1	NR (12)	NR (12)	NR (12)	NR (12)
Treatment Group	2	NR (11)	R (12)	NR (11)	NR (12)
Treatment Group	3	NR (19)	NR (19)	R (19)	R (19)
Treatment Group	4	NR (9)	R (11)	R (9)	R (11)
TOTAL		(51)	(54)	(51)	(54)

NR - Nonreward
R - Reward

APPENDIX E

INSTRUCTIONS TO THE JUDGES

ART STUDENTS' COLLAGE EVALUATION

Information for the Judges

The designs to be judged were made by students in four undergraduate Art courses (three sections of Color and Design and one section of Principles in Art).at Oklahoma State University during the Spring of 1983. For the present project, the students were supplied with the necessary materials to prepare their designs. Each student was provided a standard set of materials consisting of a bag of pre-cut shapes, glue, and a sheet of white drawing paper (14" x 18") to paste the shapes on. The plastic bag contained 120 pieces of colored construction paper as follows: 50 circles (5 sizes, 10 of each size, each in 10 different colors); 10 long strips (in 10 colors); 10 short strips (in 10 colors); 20 small squares (2 each in 10 colors); 10 triangles (in 10 colors); and 10 arch-shaped pieces (in 10 colors).

The students were given the following instructions:

> "These are the materials you will use for the activity. You'll be using these colored pieces of paper to make a design on your papers. You can use whatever pieces you want, however many of them you'd like, and glue them on your paper in any way that you wish. There are two things for you to keep in mind:—first, please don't use any materials other than what we have laid out here for you. So, if you have a pencil or pen, don't use it.
> Second, we would like you to make a design which conveys a feeling of silliness, like when you are "feeling silly" or "acting silly". So, try as much as possible to make your design express a feeling of silliness."

The students were told that the main purpose of the study was the assessment of artistic perceptions, attitudes and feelings. No emphasis was placed upon creative or technical performance. Thus the students performed in a non-evaluative situation. The students were also told that the experimenters were not interested at all in the designs themselves, but that the purpose of the art activity was to provide the students with an experience of this nature prior to answering a questionnaire. While working on the designs the students remained in their usual studio and the entire group in each class participated at one time. The experimenters encouraged independent work. The designs were collected approximately 20 minutes after the starting time even though the time factor was not made salient to the students. Most of the students finished their designs within this time limit.

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Instructions for the Judges

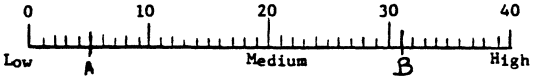
1. Inspect all designs.

2. Before making any judgments, inspect the designs of a given set.

3. Examine the evaluation form and see if you understand the items, and how to mark the form:

   Example: Suppose that one of the items was Effort Evident, and you wanted to rate the designs in a given set giving design A a rather low score of 5, and design B a higher score of 31, you would mark the scale with a single line at the values of 5 and 31, and write the corresponding letter of the design under each line:

   Effort Evident: The amount of effort that is evident in the product:



4. Make sure that the design set number on the board matches the number on the evaluation form.

5. In rating the designs, try to keep the dimensions independent of one another, as much as possible, and try to avoid ties.

Do you have any questions?

Instructions for the Judges (continued)

Criteria to consider when evaluating the artworks on Creativity and Technical goodness:

Creativity. Using your own subjective definition of "creativity", the degree to which the design is creative.

1. Novel use of materials. The degree to which the work shows novel use of materials
2. Novel Idea. The degree to which the design itself shows a novel idea
3. Effort evident. The amount of effort that is evident in the product.
4. Variation of shapes. The degree to which the design shows good variation of shapes.
5. Detail. The amount of detail in the work.
6. Complexity. The level of complexity of the design.

Technical goodness. The degree to which the design is good technically.

1. Overall organization. The degree to which the design shows good organization.
2. Neatness. The amount of neatness shown in the work.
3. Planning Evident. The amount of planning evident in the product.
4. Expression of meaning. The degree to which the design conveys a literal, symbolic, or emotional meaning to you.

APPENDIX F

EVALUATION FORMS

PROJECT EVALUATION
Judges Data

Date: _____

1. Your name: _____

2. Your sex (check one): Woman _____ Man _____

3. Your current age: _____

4. The highest level of education you have completed: Bachelor's Degree _____ Master's Degree _____ Specialist's Degree _____ Doctoral Degree _____.

5. Your major and minor areas of specialization:

6. Courses taught up to the present time, and the grade level at which they were/are taught:

7. What training have you had in art? (Indicate what kind of training, for how long, and at what ages).

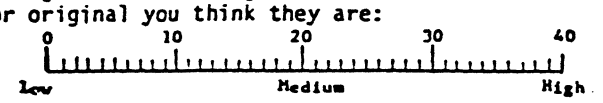
8. Have you ever served as a judge in an art show or art competition?

   If so, please describe event in terms of age of participants, kind of projects, and the like.

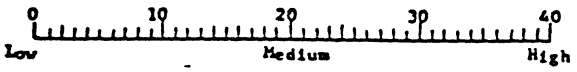
COLLAGE EVALUATION

Design Set No. _____

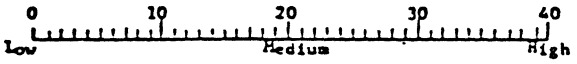
1. Creativity or imaginativeness (regardless of craftsmanship). Rate these designs on how novel or original you think they are:



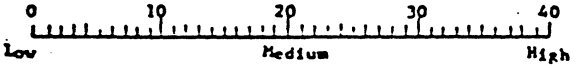
2. Craftsmanship or technical skill (regardless of originality). Rate these designs on technical goodness:



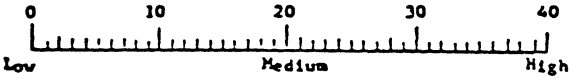
3. Aesthetic Value. Rate these designs on their overall artistic beauty:



4. Maturity. Rate these designs in terms of how mature they are for the estimated age of the student:



5. Overall Rating. How would you rate these designs if you were to award prices in a competitive art show?



Comments:

PROJECT EVALUATION

Respondent Data

1. Your number (write in) _____

(No Names)

2. Your sex (check one): Woman _____ Man _____

3. Your race or ethnic background: _____

4. Your current age: _____

5. Your year in school (check one): Freshman _____; Sophomore _____;

Junior _____; Senior _____; Graduate _____

6. Your major or planned major _____

7. What training have you had in art? (Indicate what kind of training, f
how long, and at what ages).

8. Are any of your relatives artists? (Indicate relationship and nature
artistic activity).

Questionnaire Self Report Page 2

9. Mark in the space between the vertical lines to indicate which adjective best describes your opinion. If the adjective at the left is very definitely best, mark in the space closest to the left adjective as follows:

For example:

HOT | X | | | | | | | COLD

If both adjectives are equally descriptive, mark in the space in the middle, etc

a. Rate your ability on painting, drawing and design:

Very high | | | | | | | | Very low

b. The extent to which you enjoy painting and related art work:

Not at all | | | | | | | | Very much

c. Did you view your engagement in this activity as motivated by intrinsic factors, like your own interest, or by extrinsic factor like the instructor's instructions?

Intrinsic factors | | | | | | | | Extrinsic factors

d. Was the art activity more like work or more like leisure activit

More like work | | | | | | | | More like leis

e. How playful did you feel during the activity session?

Not at all | | | | | | | | Very much

f. The extent you found the task enjoyable:

Extremely unenjoyable | | | | | | | | Extremely enjoyable

g. How satisfied were you with your performance in the art activity

Extremely satisfied | | | | | | | | Extremely unsatisfied

h. How easy the design problem was for you?

Extremely difficult | | | | | | | | Extremely easy

i. Rate your ability on the task:

Very low | | | | | | | | Very high

Questionnaire Self Reports Page 3

j. How much you like your finished design?

Very much |—|—|—|—|—|—|—| Not at all

k. How much pressure did you feel during the activity session?

Very much |—|—|—|—|—|—|—| None

l. How likely you would be to volunteer for a similar project in the future?

Extremely likely |—|—|—|—|—|—|—| Extremely unlikely

OBJECTIVE RATINGS

Design Set No. _____

1. Number of pieces used:

   A. _____ B. _____

2. Number of colors used:

   A. _____ B. _____

3. Number of pieces made 3-Dimensional:

   A. _____ B. _____

4. Number of pieces altered in some way: (ripped, folded, and so on)

   A. _____ B. _____

5. Number of global shape categories used: (circle, square, etc.)

   A. _____ B. _____

6. Number of individual shape categories used: (large circle, medium circle, small circle, long strip, short strip, etc.)

   A. _____ B. _____

7. Percent of area covered by pieces:

   A. _____ B. _____

OBJECTIVE RATINGS

Design Set No. _____

1. Number of pieces used:

   A. _____ B. _____

2. Number of colors used:

   A. _____ B. _____

3. Number of pieces made 3-Dimensional:

   A. _____ B. _____

4. Number of pieces altered in some way: (ripped, folded, and so on)

   A. _____ B. _____

5. Number of global shape categories used: (circle, square, etc.)

   A. _____ B. _____

6. Number of individual shape categories used: (large circle, medium circle, small circle, long strip, short strip, etc.)

   A. _____ B. _____

7. Percent of area covered by pieces:

   A. _____ B. _____

RECORD FORM

GORHAM-HOLTZMAN GROUP INKBLOT TECHNIQUE

Name_____ Age_____ Sex_____ Form_____ Date_____

School Grade_____ Occupation_____

DIRECTIONS

You will be shown a number of inkblots, one by one, for one minute each. On this answer sheet, write down in a few words (4-8) what each inkblot looks like to you. There are no right or wrong answers, just write what it looks like to you. You may use the shape, color, texture, movement or combinations of these in forming your answers. In the box [1, ½, ¼,] put a circle around 1 if you used the whole inkblot, circle ½ if you used about one-half of the inkblot and circle ¼ if you used any part smaller than one-half of the inkblot.

1	1 ½ ¼	
2	1 ½ ¼	
3	1 ½ ¼	
4	1 ½ ¼	
5	1 ½ ¼	
6	1 ½ ¼	
7	1 ½ ¼	
8	1 ½ ¼	
9	1 ½ ¼	
10	1 ½ ¼	
11	1 ½ ¼	
12	1 ½ ¼	
13	1 ½ ¼	
14	1 ½ ¼	
15	1 ½ ¼	
16	1 ½ ¼	
17	1 ½ ¼	
18	1 ½ ¼	
19	1 ½ ¼	

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Gorham-Holtzman Group Inkblot Technique Page 2

20	1 ½ ¼	
21	1 ½ ¼	
22	1 ½ ¼	
23	1 ½ ¼	
24	1 ½ ¼	
25	1 ½ ¼	
26	1 ½ ¼	
27	1 ½ ¼	
28	1 ½ ¼	
29	1 ½ ¼	
30	1 ½ ¼	
31	1 ½ ¼	
32	1 ½ ¼	
33	1 ½ ¼	
34	1 ½ ¼	
35	1 ½ ¼	
36	1 ½ ¼	
37	1 ½ ¼	
38	1 ½ ¼	
39	1 ½ ¼	
40	1 ½ ¼	
41	1 ½ ¼	
42	1 ½ ¼	
43	1 ½ ¼	
44	1 ½ ¼	
45	1 ½ ¼	

APPENDIX G

INSTRUCTIONS TO THE SUBJECTS

Session I: Baseline Standard Instructions for Art Activity

> This is part of an ongoing project to study artistic attitudes, feelings and perceptions. We are going to do several things today. The first thing will be to prepare a collage.
>
> These are the materials you will use for the activity. You'll be using these colored pieces of paper to make a design on your papers. You can use whatever pieces you want, however many of them you'd like, and glue them on your paper in any way that you wish. There are two things for you to keep in mind: first, please don't use any materials other than what we have laid out here for you. So if you have a pencil or pen, don't use it. Second, we would like you to make a design which conveys a feeling of silliness, like when you are "feeling silly" or "acting silly". So, try as much as possible to make your design express a feeling of silliness.

In order to avoid conveying the idea that the artworks were going to be evaluated in any way, the instructions continued:

> After you finish the design, you will be asked to fill out a questionnaire. We are not interested in the collage itself, or how you go about putting it together. However, please take the task seriously because we are interested in how the task affects your response to the questionnaire that follows.
>
> Work independently and do not talk to your classmates. Time is not a factor but try to do the best you can in the time available. I will ask you to stop working at _____. To keep your work anonymous, and assure you that you are not identified with it, I am going to ask you to draw a random number and use that number to identify your work and questionnaire. Keep this number with you and write it down somewhere in your materials or book that you normally bring to class.
>
> Although your work will not be graded or count in any way toward your grade, try to use the problem as an opportunity to display your technical skill and creativity. Any questions?

To conclude the instructions, the instructor added:

> For your information, so that these artworks do not go to waste, they are going to be donated to different nurseries in Stillwater, to serve as wall decorations.

Session II: Stantand Instructions for Art Activity

This is the second and final part of an ongoing project to study artistic attitudes, feelings and perceptions. The concern of artists' perceptions, attitudes and feelings has been subject of study for many years. Getzels and Csikszentmihalyi's study for instance examined the artistic perceptions and attitudes of art students from the School of the Art Institute of Chicago. Our interest is to do the same with O.S.U. students. Now that you are quite familiar with the materials and the activity, we would like to do the task again and report your attitudes, feelings and perceptions.

We are going first to prepare a collage. As before, you will use these materials for the activity. You'll be using these colored pieces of paper to make a design design on your paper. You can use whatever pieces you want, however many of them you'd like, and glue them on your paper in anyway that you wish. There are two things for you to keep in mind: first, please don't use any materials other than what we have laid out here foryou. So, if you have a pencil or pen, don't use it.

Once again, we would like you to make a design which conveys a feeling of silliness, like when you are "feeling silly" or "acting silly". So, try as much as possible to make your design express a feeling of silliness.

After you finish the design, you will be asked to fill out a questionnaire. We are not interested in the collage itself, or how you go about putting it together. However, please take the task seriously because we are interested in how the task affects your response to the questionnaire that follows.

Work independently and do not talk to your classmates. Time is not a factor but try to do the best you can in the time available. I will I will ask you to stop working at _____. (The subjects were allowed 20 minutes to work on the artworks). Write on back of projects the same number you used in the previous collage. If you do not remember your number, please try to find the questionnaire you fill out last time where your numbers are recorded.

Although your work will not be graded or count in any way toward your grade, try to use the problem as an opportunity to display your technical skill and creativity.

For your information, so that these artworks do not go to waste, they are going to be donated to different nurseries in Stillwater, to serve as wall decorations.

APPENDIX H

RAW DATA

Raw Data

Subjective Ratings (Column 1, Lines 1, 2, 3, and 4)

Column	Variable
4-5	Subject Number
7	Experimental Group (1, 2, 3, or 4)
9	Session (1 or 2)
11	Reward (No = 1; Yes = 2)
13	Major (Art Related = 1; Art Nonrelated = 2)
15	Classification (Freshman = 1; Sophomore = 2; Junior = 3; Senior = 4; Graduate = 5)
17	Art Training (Yes = 1; No = 2)
19	Artists in the Family (Yes = 1; No = 2)
21-22	Creativity
24-25	Craftsmanship
27-28	Aesthetic Value
30-31	Maturity
33-34	Overall Rating

Objective Ratings (Column 1, Line 1)

Column	Variable
37-38	Number of pieces used
40-41	Number of colors used
43-44	Number of pieces made 3 dimensional
47-48	Number of pieces altered in some way
50	Number of global-shape categories used (circle, triangle, square, etc.)

Objective Ratings Raw Data (continued)

Column	Variable
52-53	Number of individual-shape categories used (large, medium, small circle, etc.)
55-57	Percent of area covered by pieces

The Holtzman Inkblot Technique (HIT) (Column 1, Line 5)

Column	Variable
4-5	Subject Number
6	HIT Form (A = 1; B = 2)
7	Experimental Group (1, 2, 3, or 4)
8	Session (1 or 2)
9	Reward (No = 1; Yes = 2)
10	Major (Art Related = 1; Art Nonrelated = 2)
11	Art Training (Yes = 1; No = 2)
12	Artists in the Family (Yes = 1; No = 2)
13-14	Age
16	Sex (Male = 1; Female = 2)
18	Classification (Freshman = 1; Sophomore = 2; Junior = 3; Senior = 4; Graduate = 5)
20-21	Rejection
23-24	Location
26-27	Space
29-31	Form Definetness
33-34	Form Appropriateness
36-37	Color
39-40	Shading
42-43	Movement

HIT Raw Data (continued)

Column	Variable
45-46	Pathognomic Verbalization
48-49	Integration
51-52	Human
54-55	Animal
57-58	Anatomy
60-61	Sex
63-64	Abstract
66-67	Anxiety
69-70	Hostility
72-73	Barrier
75-76	Penetration
78-79	Balance

Subjective Judge Ratings, Objective Ratings, and Holtzman Inkblot Technique Raw Data:

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LNSITE SOURCE UTILITY

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 289      5  431111222219 1 2 01 31 01 093 37 26 12 31 02 02 31 13 02 00 02 19 16 05 03 00
 290      5  432121222219 1 2 00 33 01 086 37 27 15 35 06 04 27 25 04 01 00 21 16 10 01 00
 291      1  44 3 1 1 1 2 2 2 19 25 17 21 18  27  9  0   0 5  8  60
 292      1  44 3 2 2 1 2 2 2 29 27 27 39 30  42 10  0   0 6  8  75
 293      2  44 3 1 1 1 2 2 2  0 20  0  0  0
 294      2  44 3 2 2 1 2 2 2  7 35  5  8 10

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FILE: DVAFAC

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296      3  44 3 2 2 1 2 2 2 11 18 13 11 13
297      4  44 3 1 1 1 2 2 2  8 18 17 13 13
298      4  44 3 2 2 1 2 2 2 12 16 11 19 11
299      5  44131122219 2 2 00 34 02 090 40 20 23 35 03 09 16 32 01 00 00 03 09 04 01 00
300      5  44232222219 2 2 00 28 02 078 43 25 04 51 03 06 26 24 01 00 00 09 16 14 03 00
301      1  45 1 1 1 2 5 2 2 22 24 21 19 21  45 10  9   9 6 10  75
302      1  45 1 2 1 2 5 2 2 24 26 23 21 23  34 10 11  11 5  7  70
303      2  45 1 1 1 2 5 2 2 20 10 20 20 18
304      2  45 1 2 1 2 5 2 2  2  7 10 17 12
305      3  45 1 1 1 2 5 2 2 26 27 15 23 23
306      3  45 1 2 1 2 5 2 2 11 19  9 16 16
307      4  45 1 1 1 2 5 2 2 28 22 18 27 27
308      4  45 1 2 1 2 5 2 2 19 24 16 24 22
309      5  45111122224 1 5 01 13 00 086 33 19 19 35 03 06 22 23 07 00 00 15 15 11 10 00
310      5  45212122226 1 5 00 07 01 083 36 26 23 56 02 04 19 22 04 01 00 24 15 09 05 00
311      1  46 1 1 1 2 4 2 1 18 16 19 21 18  55 10  7   7 5  9  70
312      1  46 1 2 1 2 4 2 1 16 14 17 19 16  50 10  5   6 5 10  75
313      2  46 1 1 1 2 4 2 1  9 18  1  5  3
314      2  46 1 2 1 2 4 2 1 17 16  0  4  2
315      3  46 1 1 1 2 4 2 1  5 15 13  8 13
316      3  46 1 2 1 2 4 2 1 11 25  7 15 18
317      4  46 1 1 1 2 4 2 1 13 16 15 12  8
318      4  46 1 2 1 2 4 2 1 16 14 17 14 12
319      5  46111121122 1 4 28 13 00 087 50 04 02 13 05 01 12 07 03 00 00 03 05 02 03 00
320      5  46212121122 1 4 23 12 01 078 49 04 02 12 04 00 11 21 00 00 00 02 04 04 00 00
321      1  47 3 1 1 1 2 2 2 16 16 17 17 16  34 10  0   0 3  6  50
322      1  47 3 2 2 1 2 2 2 18 18 19 21 18  45  9  3   0 6 11  70
323      2  47 3 1 1 1 2 2 2 24 20 20 20 20
324      2  47 3 2 2 1 2 2 2  6 19  2  4  4
325      3  47 3 1 1 1 2 2 2  5 19 14 24 18
326      3  47 3 2 2 1 2 2 2 10 25 10 15 15
327      4  47 3 1 1 1 2 2 2  2  8  7  4  4
328      4  47 3 2 2 1 2 2 2  7  5  3  7  7
329      5  47131122119 2 2 01 30 01 085 38 17 09 30 01 07 29 18 03 00 01 07 11 08 01 00
330      5  47232222119 2 2 00 31 01 085 47 29 11 49 05 08 37 13 02 00 00 21 14 13 03 00
331      1  52 2 1 1 1 2 2 1 27 24 27 24 28  58 10  7   2 6  9  90
332      1  52 2 2 1 1 2 2 1 34 30 35 26 33  98 10  9   9 6 11 100
333      2  52 2 1 1 1 2 2 1 22 23 15 16 18
334      2  52 2 2 1 1 2 2 1 27 24 25 20 20
335      3  52 2 1 1 1 2 2 1 11 16 14  8 14
336      3  52 2 2 1 1 2 2 1  9 10  2  4  5
337      4  52 2 1 1 1 2 2 1 22 18 14 24 21
338      4  52 2 2 1 1 2 2 1 12 13  7  7 13
339      5  52121221222 2 2 00 06 00 103 32 05 03 52 10 07 30 31 01 00 00 07 06 09 04 00
340      5  52222121222 2 2 00 11 00 079 44 32 22 45 02 07 26 17 01 00 00 12 14 12 04 00
341      1  57 4 1 1 1 2 1 1 21 30 19 19 19 120 10  9   8 6 11 100
342      1  57 4 2 2 1 2 1 1 23 25 21 21 21  93 10  0   0 6 11 100
343      2  57 4 1 1 1 2 1 1 37 12 25 30 25
344      2  57 4 2 2 1 2 1 1 32 10 20 28 20
345      3  57 4 1 1 1 2 1 1 10 24 18 18 18
346      3  57 4 2 2 1 2 1 1  7 19  7 11 12
347      4  57 4 1 1 1 2 1 1 27 28 28 31 21
348      4  57 4 2 2 1 2 1 1 25 29 25 31 19
349      5  57141211219 2 2 00 11 00 084 38 09 00 62 27 06 26 25 02 01 00 17 20 15 06 00
350      5  57262211219 2 2 01 34 02 090 42 17 02 98 04 04 33 31 00 00 02 23 17 13 03 00

LINE     12345678901234567890123456789012345678901234567890123456789012345678901234567890
         0        1         2         3         4         5         6         7         8
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Pathognomic Vebalization Raw Data

Column	Variable
1-3	Subject Number
4	Session (1 or 2)
5	Experimental Group (1, 2, 3, or 4)
6	Rewarded (No = 1; Yes = 2)
7	Training in Art (Yes = 1; No = 2)
8	Artists in the Family (Yes = 1; No = 2)
9	Sex of Subject (Male = 1; Female = 2)
10-11	Autistic Logic
12-13	Queer Response
14-15	Fabulized Combination
16-17	Fabulation
18-19	Deterioration Color
20-21	Self Reference
22-23	Contamination

NOTE: Other categories of PV responses such as Incoherence and Absurd Response were not found among the subjects of the present study.

Pathognomic Verbalization Raw Data

```
007131222020100000000000
008131222020200030C0 C00
009122122000303000000C0C
C1114222202010400000CCC
012131212020020201020C0C
C1413122100000200000 20C
C1611122202000403000000
017131222000021C06020C0C
018111122000200020000000
C2C111112000030C00000C0C
021131111100050400000C00
C2213122220000C0201000C00
024111222000306C0000000
025131212000004020000C00
026131211000100000000000
027131112000010C00020C00
031131212000010000000000
C3213111200020200000C00
033131122020004000000C00
C3413122200061202000000
035111122000006200000C00
036111212000020400000000
038111212000020600000000
039111111020202041020200C0
041112212000010200000C00
042131221000002010000C00
043111221000000002000C00
044131222010010001000C00
045111221000000001020000
047131212010000000000C00
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057142122030904010200C00
067122222000000C00000000
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081142222000021000000000
082122211020105020000C00
087142222000019000000000
096122112000006010200C00
097142111020002000000C00
099142222030200C03020C0C
102142212001404020200C0
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108142112000031400000C00
11C122122000002000002C0
111122222000402000000C00
112122112000C04020000C0C
121142221020804000200000
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Questionnaire Self Ratings Raw Data

Column	Variable
1-3	Subject Number
5	Experimental Group (1, 2, 3, or 4)
7	Session (1 or 2)
9	Sex of Subject (Male = 1; Female = 2)
11	Race (Caucasian = 1; Other = 2)
13-14	Age
16	Classification (Fresman = 1; Sophomore = 2; Junior = 3; Senior = 4; Graduate = 5)
18	Major (Art Related = 1; Art Nonrelated = 2)
20	Training in Art (Yes = 1; No = 2)
22	Artists in the Family (Yes = 1; No = 2)
24-48	Questionnaire Items 1-13
26	Reward (No = 1, Yes = 2)

Questionnaire Self Reports Raw Data

LNSITE SOURCE UTILITY

FILE: DVAFA2

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   2       35 1 2 1 1 19 1 1 1 2 2 7 1 7 7 7 6 7 7 2 7 1   1
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   4       19 1 2 1 1 20 3 2 2 1 6 2 6 6 1 3 2 4 4 5 6 7   1
   5       16 1 1 1 1 20 2 2 2 2 5 7 3 7 7 7 2 7 6 2 7 2   1
   6       16 1 2 1 1 20 2 2 2 2 4 3 2 7 6 7 2 6 6 2 6 2   1
   7       24 1 1 1 1 20 2 2 2 2 5 3 4 6 2 3 6 6 2 7 6 6   1
   8       24 1 2 1 1 20 2 2 2 2 5 1 4 5 1 2 4 5 3 5 5 7   1
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  14       45 1 2 2 1 26 5 2 2 2 3 7 4 6 5 6 6 6 6 3 7 1   1
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  16       46 1 2 2 1 22 4 2 1 1 3 2 6 4 3 3 4 5 4 3 6 7   1
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  20       36 1 2 1 1 35 1 2 2 1 4 7 4 7 3 4 4 4 4 4 7 7   1
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  39          4 1 1 1 1 19 2 2 2 1 5 6 1 6 5 6 3 6 5 3 7 2   1
  40          4 2 1 1 1 19 2 2 2 1 4 6 1 7 6 2 2 6 5 2 7 1 1 2
  41       87 4 1 1 1 1 19 1 2 2 2 3 6 2 6 6 6 3 7 6 2 7 1   1
  42       87 4 2 1 1 1 19 1 2 2 2 3 6 1 6 6 5 4 5 5 4 7 2 1 2
  43       99 4 1 1 1 1 20 2 2 2 2 2 7 1 7 7 7 2 7 5 2 7 2   1
  44       99 4 2 1 1 1 20 2 2 2 2 2 7 4 5 6 5 5 5 4 4 7 3 1 2
  45      121 4 1 2 1 1 19 2 1 2 1 2 5 4 2 6 4 5 3 6 5 3 7 3   1
  46      121 4 2 2 1 1 19 2 1 2 2 4 3 5 7 4 3 6 6 5 4 7 1 1 2
  47       27 3 1 1 1 1 20 2 2 1 1 3 6 1 7 6 6 3 6 6 2 7 2   1
  48       27 3 2 1 1 1 20 2 2 1 1 3 6 2 6 4 5 2 7 6 2 7 4 1 2
  49       32 3 1 1 1 1 24 2 2 1 1 3 7 1 7 7 7 1 5 4 2 7 1   1

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LNSITE SOURCE UTILITY

FILE: DVAFA2

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  55       22 3 1 1 1 21 3 2 2 2 6 4 1 7 6 6 2 6 4 2 6 2   1
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  57        8 3 1 1 1 19 2 2 2 2 5 5 4 4 4 3 1 7 4 2 7 1   1
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  61       26 3 1 2 1 20 2 2 2 1 5 5 3 7 7 6 3 6 6 3 7 1   1
  62       26 3 2 2 1 20 2 2 2 1 3 7 4 3 5 5 7 6 2 7 1 1   2
  63       17 3 1 1 1 22 4 2 2 2 6 5 3 6 7 6 3 7 6 3 7 3   1
  64       17 3 2 1 1 22 4 2 2 2 3 5 2 6 6 6 3 6 6 2 2 3 2 2
  65        4 3 1 1 1 22 4 2 2 2 5 3 4 6 6 5 2 7 7 2 7 1   1
  66        4 3 2 1 1 22 4 2 2 2 3 6 2 7 6 6 1 7 7 1 7 1 1 2
  67       14 3 1 2 1 20 2 1 2 2 2 6 2 4 1 3 4 5 4 3 3 6   1
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  72       31 3 2 1 1 20 2 2 2 1 3 5 6 7 6 4 4 7 6 3 7 2 1 2
  73       33 3 1 1 1 19 1 2 1 2 3 6 2 7 7 6 2 7 7 2 7 4   1
  74       33 3 2 1 1 19 1 2 1 2 4 6 6 6 5 4 2 7 6 1 7 4 1 2
  75       12 3 1 1 1 19 2 2 2 1 3 6 5 7 6 5 2 7 6 2 7 2   1
  76       12 3 2 1 1 19 2 2 2 1 2 6 4 7 7 6 1 7 6 1 7 1 3 2
  77       34 3 1 1 1 20 2 2 2 2 6 3 7 7 7 6 3 7 4 2 6 4   1
  78       34 3 2 1 1 20 2 2 2 2 4 2 6 5 5 4 3 7 4 3 4 7 1 2
  79       25 3 1 1 1 21 4 2 2 1 4 6 1 7 5 5 6 6 5 1 7 1   1
  80       25 3 2 1 1 21 4 2 2 1 5 6 1 7 6 7 1 6 6 1 7 1 1 2
  81       44 3 1 1 1 19 2 2 2 2 6 3 2 7 6 6 3 5 5 3 5 4   1
  82       44 3 2 1 1 19 2 2 2 2 2 7 1 7 7 6 6 7 6 5 7 3 1 2
  83       47 3 1 1 1 19 2 2 2 1 5 4 2 7 7 7 1 6 6 2 7 2   1
  84       47 3 2 1 1 19 2 2 2 1 3 6 1 7 6 6 2 7 6 1 7 2 1 2
  85       94 2 1 1 1 19 2 1 1 2 3 7 5 6 5 5 2 7 5 3 7 2   1
  86       94 2 2 1 1 19 2 1 1 2 2 1 7 6 2 3 5 5 4 5 7 2   1
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  90      107 2 2 1 1 20 2 2 2 1 4 7 6 4 4 6 6 4 3 5 3 4   1
  91      111 2 1 1 1 20 2 2 2 2 6 2 1 7 6 5 3 7 5 3 7 3   1
  92      111 2 2 1 1 20 2 2 2 2 6 4 2 7 5 3 3 7 5 4 6 7   1
  93        9 2 1 1 1 19 1 2 1 2 4 7 4 6 5 4 4 5 5 4 6 1   1
  94        9 2 2 1 1 19 1 2 1 2 3 7 1 6 6 4 5 6 5 2 7 1   1
  95       67 2 1 1 1 18 1 2 2 2 5 5 1 6 2 5 5 2 5 3 7 4   1
  96       67 2 2 1 1 18 1 2 2 2 4 5 2 6 3 3 4 5 5 4 7 7   1
  97       76 2 1 1 1 20 2 2 1 1 7 1 6 1 2 3 5 5 4 3 6 3   1
  98       76 2 2 1 1 20 2 2 1 1 7 2 7 2 1 2 5 2 2 5 6 6   1

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LNSITE SOURCE U1

FILE: DVAFAZ

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 100       96 2 2 1 1 18 1 1 1 1 3 6 7 6 2 4 4 4 5 3 2 3   1
 101       52 2 1 1 1 22 2 2 1 1 3 7 2 6 7 6 3 7 5 5 6 2   1
 102       52 2 2 1 1 22 2 2 1 2 3 7 3 6 6 5 4 7 5 3 7 3   1
 103       92 2 1 2 2 22 4 2 2 1 2 7 1 7 7 7 1 7 7 1 7 1   1
 104       92 2 2 2 2 22 4 2 2 1 1 7 1 7 6 7 1 7 7 1 7 1   1
 105      112 2 1 1 1 19 2 1 1 1 2 6 4 5 6 1 3 7 6 5 7 4   1
 106      112 2 2 1 1 19 2 1 1 1 3 6 4 7 5 6 4 5 4 4 7 4   1
           70
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LINE      12345678901234567890123456789012345678901234567890123
          0         1         2         3         4         5
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APPENDIX I

SELECTED STATISTICAL ANALYSES

Subjective Ratings

Nomenclature

X	Average Judge Ratings, Session I
Y	Average Judge Ratings, Session II
A	Individual Judge Ratings, Session I
B	Individual Judge Ratings, Session II
D	Individual Judge Difference Scores (B-A)
1	Creativity
2	Craftsmanship
3	Aesthetic Value
4	Maturity
5	Overall Rating
Cond	Experimental Groups (4 in total)
Sex	Sex of Subjects
Artr	Art Training
Artf	Artists in the Family
Reward	Monetary reward

EUGENIA VAFAIE HOME ECO 12-9-83
FILE DVAFAIE (CREATION DATE = SVAFA6

ONEWAY

VARIABLE X1
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	155.0966	51.6989	2.146	.1070
WITHIN GROUPS	47	1132.2588	24.0906		
TOTAL	50	1287.3554			

VARIABLE X2
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	118.3781	39.4594	2.341	.0853
WITHIN GROUPS	47	792.2567	16.8565		
TOTAL	50	910.6348			

VARIABLE X3
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	120.8860	40.2953	1.827	.1551
WITHIN GROUPS	47	1036.4008	22.0511		
TOTAL	50	1157.2868			

VARIABLE X4
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	122.2502	40.7501	1.777	.1644
WITHIN GROUPS	47	1077.7939	22.9318		
TOTAL	50	1200.0441			

VARIABLE X5
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	121.2024	40.4008	1.842	.1525
WITHIN GROUPS	47	1030.8589	21.9332		
TOTAL	50	1152.0613			

EUGENIA VAFAIE HOME ECO 12-9-83
FILE DVAFAIE (CREATION DATE = SVAFAC

ONEWAY

VARIABLE Y1
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	137.4912	45.8304	1.864	.1486
WITHIN GROUPS	47	1155.4671	24.5844		
TOTAL	50	1292.9583			

VARIABLE Y2
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	61.1823	20.3941	1.814	.1575
WITHIN GROUPS	47	528.4452	11.2435		
TOTAL	50	589.6275			

VARIABLE Y3
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	155.6710	51.8903	2.668	.0584
WITHIN GROUPS	47	913.9564	19.4459		
TOTAL	50	1069.6275			

VARIABLE Y4
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	185.6650	61.8883	3.619	.0197
WITHIN GROUPS	47	803.6586	17.0991		
TOTAL	50	989.3235			

VARIABLE Y5
BY COND

ANALYSIS OF VARIANCE

SOURCE	D.F.	SUM OF SQUARES	MEAN SQUARES	F RATIO	F PROB.
BETWEEN GROUPS	3	125.8678	41.9559	2.379	.0816
WITHIN GROUPS	47	828.9141	17.6365		
TOTAL	50	954.7819			

EUGENIA VAFAIE HOME ECONOMICS 21-17-83-DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

B2
BY ARTRN
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	366.104	2	183.052	3.942	.026
ARTRN	365.673	1	365.673	7.874	.007
REWARD	12.047	1	12.047	.259	.613
2-WAY INTERACTIONS	162.650	1	162.650	3.503	.068
ARTRN REWARD	162.650	1	162.650	3.503	.068
EXPLAINED	528.754	3	176.251	3.795	.016
RESIDUAL	2182.579	47	46.438		
TOTAL	2711.333	50	54.227		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

B2 BY ARTINF REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	212.197	2	106.099	2.006	.146
ARTINF	211.766	1	211.766	4.004	.051
REWARD	17.648	1	17.648	.334	.566
2-WAY INTERACTIONS	13.665	1	13.665	.258	.614
ARTINF REWARD	13.665	1	13.665	.258	.614
EXPLAINED	225.863	3	75.288	1.424	.248
RESIDUAL	2485.470	47	52.882		
TOTAL	2711.333	50	54.227		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

BY B4
ARTRN
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	380.543	2	190.272	2.965	.061
ARTRN	314.481	1	314.481	4.901	.032
REWARD	29.402	1	29.402	.458	.502
2-WAY INTERACTIONS	163.452	1	163.452	2.547	.117
ARTRN REWARD	163.452	1	163.452	2.547	.117
EXPLAINED	543.995	3	181.332	2.826	.049
RESIDUAL	3015.652	47	64.163		
TOTAL	3559.647	50	71.193		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

R4
BY ARTRN
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	291.961	2	145.980	1.434	.249
ARTRN	139.190	1	139.190	1.367	.248
REWARD	195.034	1	195.034	1.916	.173
2-WAY INTERACTIONS	331.403	1	331.403	3.255	.078
ARTRN REWARD	331.403	1	331.403	3.255	.078
EXPLAINED	623.364	3	207.788	2.041	.121
RESIDUAL	4785.146	47	101.812		
TOTAL	5408.510	50	108.170		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

B5
BY SEX
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	418.572	2	209.286	2.087	.135
SEX	53.019	1	53.019	.529	.471
REWARD	381.247	1	381.247	3.802	.057
2-WAY INTERACTIONS	15.379	1	15.379	.153	.697
SEX REWARD	15.379	1	15.379	.153	.697
EXPLAINED	433.950	3	144.650	1.442	.242
RESIDUAL	4713.461	47	100.286		
TOTAL	5147.412	50	102.948		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

D1
BY SEX
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	415.460	2	207.730	2.912	.064
SEX	112.198	1	112.198	1.573	.216
REWARD	280.246	1	280.246	3.928	.053
2-WAY INTERACTIONS	95.330	1	95.330	1.336	.254
SEX REWARD	95.330	1	95.330	1.336	.254
EXPLAINED	510.790	3	170.263	2.387	.081
RESIDUAL	3352.857	47	71.337		
TOTAL	3863.647	50	77.273		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-82 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

D1
BY ARTRN
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	308.692	2	154.346	2.086	.136
ARTRN	5.430	1	5.430	.073	.788
REWARD	284.935	1	284.935	3.850	.056
2-WAY INTERACTIONS	76.925	1	76.925	1.040	.313
ARTRN REWARD	76.925	1	76.925	1.040	.313
EXPLAINED	385.616	3	128.539	1.737	.172
RESIDUAL	3478.031	47	74.001		
TOTAL	3863.647	50	77.273		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

D1
BY ARTINE
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	489.923	2	244.962	3.448	.040
ARTINE	186.661	1	186.661	2.627	.112
REWARD	409.267	1	409.267	5.760	.020
2-WAY INTERACTIONS	34.381	1	34.381	.484	.490
ARTINE REWARD	34.381	1	34.381	.484	.490
EXPLAINED	524.305	3	174.768	2.460	.074
RESIDUAL	3339.342	47	71.050		
TOTAL	3863.647	50	77.273		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

D2
BY SEX
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	51.745	2	25.872	.979	.383
SEX	.131	1	.131	.005	.944
REWARD	51.740	1	51.740	1.957	.168
2-WAY INTERACTIONS	100.099	1	100.099	3.786	.058
SEX REWARD	100.099	1	100.099	3.786	.058
EXPLAINED	151.844	3	50.615	1.915	.140
RESIDUAL	1242.509	47	26.436		
TOTAL	1394.353	50	27.887		

EUGENIA VAFAIE HOME ECONOMICS 11-17-93 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

D2
BY SEX
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	62.872	2	31.436	1.827	.172
SEX	7.793	1	7.793	.453	.504
REWARD	52.399	1	52.399	3.045	.088
2-WAY INTERACTIONS	14.937	1	14.937	.868	.356
SEX REWARD	14.937	1	14.937	.868	.356
EXPLAINED	77.809	3	25.936	1.507	.225
RESIDUAL	808.818	47	17.209		
TOTAL	886.627	50	17.733		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-82 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

D2
BY ARTINF
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	114.833	2	57.416	3.497	.038
ARTINF	59.754	1	59.754	3.640	.063
REWARD	82.607	1	82.607	5.032	.030
2-WAY INTERACTIONS	.166	1	.166	.010	.920
ARTINF REWARD	.166	1	.166	.010	.920
EXPLAINED	114.999	3	38.333	2.335	.086
RESIDUAL	771.629	47	16.418		
TOTAL	886.627	50	17.733		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HOME ECONOMICS 11-17-83 DIFFERENCE SCORE

FILE DVAFAIE (CREATION DATE = 83/11/17.) SVAFA3

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

D2
BY ARTINF
REWARD

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	51.754	2	25.877	.976	.384
ARTINF	.140	1	.140	.005	.942
REWARD	49.802	1	49.802	1.878	.177
2-WAY INTERACTIONS	96.538	1	96.538	3.641	.062
ARTINF * REWARD	96.538	1	96.538	3.641	.062
EXPLAINED	148.291	3	49.430	1.864	.149
RESIDUAL	1246.061	47	26.512		
TOTAL	1394.353	50	27.887		

51 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

Questionnaire Self Reports

Nomenclature

Group 1	Nonreward group
Group 2	Reward group
A	Session I
B	Session II
1-11	Questionnaire Items 1 to 11. For further information on Questionnaire Items refer to Appendix F.

T - T E S T

GROUP 1 - REWARD EQ 1.
GROUP 2 - REWARD EQ 2.

VARIABLE		NUMBER OF CASES	MEAN	STANDARD DEVIATION	STANDARD ERROR	F VALUE	2-TAIL PROB.	POOLED VARIANCE ESTIMATE T VALUE	POOLED VARIANCE ESTIMATE DEGREES OF FREEDOM	POOLED VARIANCE ESTIMATE 2-TAIL PROB.	SEPARATE VARIANCE ESTIMATE T VALUE	SEPARATE VARIANCE ESTIMATE DEGREES OF FREEDOM	SEPARATE VARIANCE ESTIMATE 2-TAIL PROB.
B1	GROUP 1	23	3.5652	1.590	.332	2.42	.027	.74	51	.464	.70	35.44	.490
	GROUP 2	30	3.3000	1.022	.187								
B2	GROUP 1	23	4.9130	2.275	.474	1.82	.133	-.77	51	.443	-.74	39.20	.462
	GROUP 2	30	5.3333	1.688	.308								
B3	GROUP 1	23	4.3913	2.105	.439	1.12	.764	2.64	51	.011	2.62	46.05	.012
	GROUP 2	30	2.9000	1.989	.363								
B4	GROUP 1	23	5.3478	1.695	.353	1.15	.711	-.78	51	.439	-.77	45.67	.444
	GROUP 2	30	5.7000	1.579	.288								
B5	GROUP 1	23	3.8696	1.866	.389	1.81	.135	-3.13	51	.003	-3.01	39.26	.005
	GROUP 2	30	5.2667	1.388	.253								
B6	GROUP 1	23	4.3478	1.613	.336	1.40	.392	-1.76	51	.085	-1.72	42.93	.093
	GROUP 2	30	5.0667	1.363	.249								
B7	GROUP 1	23	3.8696	1.359	.283	1.74	.186	1.12	51	.267	1.16	51.00	.250
	GROUP 2	30	3.3667	1.790	.327								
B8	GROUP 1	23	5.4348	1.376	.287	1.75	.157	-2.41	51	.020	-2.32	39.71	.025
	GROUP 2	30	6.2333	1.040	.190								
B9	GROUP 1	23	4.7826	1.242	.259	1.26	.553	-1.08	51	.283	-1.07	44.43	.291
	GROUP 2	30	5.1333	1.106	.202								
B10	GROUP 1	23	3.4348	1.199	.250	1.92	.118	1.47	51	.149	1.53	50.85	.132
	GROUP 2	30	2.8333	1.663	.304								
B11	GROUP 1	23	5.9130	1.505	.314	1.47	.353	-.40	51	.692	-.41	50.70	.685
	GROUP 2	30	6.1000	1.826	.333								

The Holtzman Inkblot Technique

Nomenclature

A	Session I Measures
B	Session II Measures
F	Reward (Session I)
H	Reward (Session II)
Sex	Sex of Subjects
Artr	Training in Art
Artf	Artists in the Family
1	Rejection
2	Location
3	Space
4	Form Definetness
5	Form Appropriateness
6	Color
7	Shading
8	Movement
9	Pathognomic Verbalization
10	Integration
11	Human
12	Animal
13	Anatomy
14	Sex
15	Abstract
16	Anxiety
17	Hostility

Nomenclature for HIT Statistical Analysis (continued)

18	Barrier
19	Penetration
20	Balance
21	Popular
F1	Factor I
F2	Factor II
F3	Factor III
Creat	Composite Creativity Score
Total	Composite Developmental Score
FC	Fabulized Combination (Session I Measures)
FB	Fabulation (Session I Measures)
AL	Autistic Logic (Session I Measures)
QR	Queer Response (Session I Measures)
Reward	Monetary reward

EUGENIA VAFAIE HEC 2-29-84

FILE DVAF1 (CREATION DATE = 84/09/12.) SVAF2

* * * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

AL
BY F
SEX
ARTR
ARTF

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			204.084	4	51.021	2.067	.104
F			82.182	1	82.182	3.330	.076
SEX			14.877	1	14.877	.603	.442
ARTR			112.206	1	112.206	4.546	.039
ARTF			3.406	1	3.406	.138	.712
2-WAY INTERACTIONS			155.202	6	25.867	1.048	.410
F	SEX		17.726	1	17.726	.718	.402
F	ARTR		6.685	1	6.685	.271	.606
F	ARTF		23.625	1	23.625	.957	.334
SEX	ARTR		67.091	1	67.091	2.718	.107
SEX	ARTF		11.662	1	11.662	.472	.496
ARTR	ARTF		.666	1	.666	.027	.870
3-WAY INTERACTIONS			131.625	4	32.906	1.333	.275
F	SEX	ARTR	4.926	1	4.926	.200	.658
F	SEX	ARTF	.023	1	.023	.001	.976
F	ARTR	ARTF	49.780	1	49.780	2.017	.164
SEX	ARTR	ARTF	42.584	1	42.584	1.725	.197
EXPLAINED			490.911	14	35.065	1.421	.190
RESIDUAL			962.589	39	24.682		
TOTAL			1453.500	53	27.425		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

- -

A2
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			577.769	4	144.442	1.311	.283
F			122.030	1	122.030	1.108	.299
SEX			6.856	1	6.856	.062	.804
ARTR			177.318	1	177.318	1.610	.212
ARTF			93.560	1	93.560	.849	.362
2-WAY INTERACTIONS			319.830	6	53.305	.484	.816
F	SEX		40.469	1	40.469	.367	.548
F	ARTR		105.670	1	105.670	.959	.333
F	ARTF		55.109	1	55.109	.500	.484
SEX	ARTR		60.101	1	60.101	.546	.465
SEX	ARTF		.435	1	.435	.004	.950
ARTR	ARTF		66.467	1	66.467	.603	.442
3-WAY INTERACTIONS			465.544	4	116.386	1.057	.391
F	SEX	ARTR ←	365.002	1	365.002	3.314	.076
F	SEX	ARTF	143.007	1	143.007	1.299	.261
F	ARTR	ARTF	266.833	1	266.833	2.423	.128
SEX	ARTR	ARTF	198.782	1	198.782	1.805	.187
EXPLAINED			1363.143	14	97.367	.884	.581
RESIDUAL			4295.450	39	110.140		
TOTAL			5658.593	53	106.766		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A3
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			2.674	4	.669	.892	.478
F			2.406	1	2.406	3.212	.081
SEX			.077	1	.077	.102	.751
ARTR			.048	1	.048	.064	.802
ARTF			.029	1	.029	.039	.844
2-WAY INTERACTIONS			1.354	6	.226	.301	.932
F	SEX		.187	1	.187	.250	.620
F	ARTR		.248	1	.248	.331	.568
F	ARTF		.104	1	.104	.139	.712
SEX	ARTR		.487	1	.487	.650	.425
SEX	ARTF		.006	1	.006	.008	.928
ARTR	ARTF		.402	1	.402	.537	.468
3-WAY INTERACTIONS			2.088	4	.522	.697	.599
F	SEX	ARTR	.002	1	.002	.003	.960
F	SEX	ARTF	.062	1	.062	.083	.775
F	ARTR	ARTF	1.556	1	1.556	2.076	.158
SEX	ARTR	ARTF	.008	1	.008	.011	.918
EXPLAINED			6.117	14	.437	.583	.862
RESIDUAL			29.217	39	.749		
TOTAL			35.333	53	.667		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A4
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			248.537	4	72.159	.416	.796
F			47.374	1	47.374	.273	.604
SEX			9.985	1	9.985	.058	.812
ARTR			.063	1	.063	.000	.985
ARTF			193.323	1	193.323	1.115	.297
2-WAY INTERACTIONS			472.573	6	78.762	.454	.837
F	SEX		65.393	1	65.393	.377	.543
F	ARTR		208.921	1	208.921	1.205	.279
F	ARTF		.081	1	.081	.000	.983
SEX	ARTR		43.213	1	43.213	.249	.620
SEX	ARTF		2.720	1	2.720	.015	.901
ARTR	ARTF		33.288	1	33.288	.192	.664
3-WAY INTERACTIONS			1478.601	4	369.650	2.133	.095
F	SEX	ARTR	634.926	1	634.926	3.663	.063
F	SEX	ARTF	269.917	1	269.917	1.557	.219
F	ARTR	ARTF	769.825	1	769.825	4.442	.042
SEX	ARTR	ARTF	1178.861	1	1178.861	6.802	.013
EXPLAINED			2239.811	14	159.987	.923	.543
RESIDUAL			6759.522	39	173.321		
TOTAL			8999.333	53	169.799		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A5
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	102.984	4	25.746	1.118	.362
F	42.276	1	42.276	1.836	.183
SEX	47.246	1	47.246	2.052	.160
ARTR	40.426	1	40.426	1.756	.193
ARTF	1.298	1	1.298	.056	.814
2-WAY INTERACTIONS	298.801	6	49.800	2.163	.068
F SEX	131.808	1	131.808	5.725	.022
F ARTR	7.137	1	7.137	.310	.581
F ARTF	54.414	1	54.414	2.363	.132
SEX ARTR	3.797	1	3.797	.165	.687
SEX ARTF	1.262	1	1.262	.055	.816
ARTR ARTF	.254	1	.254	.011	.917
3-WAY INTERACTIONS	26.619	4	6.655	.289	.883
F SEX ARTR	12.735	1	12.735	.553	.462
F SEX ARTF	1.352	1	1.352	.059	.810
F ARTR ARTF	2.752	1	2.752	.120	.731
SEX ARTR ARTF	1.067	1	1.067	.046	.831
EXPLAINED	428.404	14	30.600	1.329	.235
RESIDUAL	897.967	39	23.025		
TOTAL	1326.370	53	25.026		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

- - - - - - - - - - - - - - - - -

A6
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	305.871	4	76.468	1.216	.320
F	25.552	1	25.552	.406	.528
SEX	55.260	1	55.260	.878	.354
ARTR	179.116	1	179.116	2.847	.100
ARTF	12.757	1	12.757	.203	.655
2-WAY INTERACTIONS	584.052	6	97.342	1.547	.189
F SEX	122.452	1	122.452	1.946	.171
F ARTR	169.831	1	169.831	2.700	.108
F ARTF	9.173	1	9.173	.146	.705
SEX ARTR	152.335	1	152.335	2.421	.128
SEX ARTF	64.525	1	64.525	1.026	.317
ARTR ARTF	69.472	1	69.472	1.104	.300
3-WAY INTERACTIONS	435.776	4	108.944	1.732	.163
F SEX ARTR	203.758	1	203.759	3.239	.080
F SEX ARTF	152.768	1	152.768	2.428	.127
F ARTR ARTF	51.503	1	51.503	.819	.371
SEX ARTR ARTF	54.006	1	54.006	.858	.360
EXPLAINED	1325.698	14	94.693	1.505	.155
RESIDUAL	2453.506	39	62.910		
TOTAL	3779.204	53	71.306		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A7
BY F
SEX
ARTR
ARTF

* *

SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			327.622	4	81.906	1.621	.188
F			6.526	1	6.526	.129	.721
SEX			4.988	1	4.989	.099	.755
ARTR			278.582	1	278.582	5.512	.024
ARTF			.598	1	.598	.012	.914
2-WAY INTERACTIONS			230.555	6	38.426	.760	.605
F	SEX		89.206	1	89.206	1.765	.192
F	ARTR		102.173	1	102.173	2.022	.163
F	ARTF		6.010	1	6.010	.119	.732
SEX	ARTR		.008	1	.008	.000	.990
SEX	ARTF		.240	1	.240	.005	.945
ARTR	ARTF		1.446	1	1.446	.029	.867
3-WAY INTERACTIONS			163.467	4	40.867	.809	.527
F	SEX	ARTR	58.002	1	58.002	1.148	.291
F	SEX	ARTF	4.602	1	4.602	.091	.764
F	ARTR	ARTF	24.011	1	24.011	.475	.495
SEX	ARTR	ARTF	2.517	1	2.517	.050	.825
EXPLAINED			721.644	14	51.546	1.020	.455
RESIDUAL			1971.189	39	50.543		
TOTAL			2692.833	53	50.808		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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A8
BY F
SEX
ARTR
ARTF

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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			1552.380	4	388.095	3.392	.018
F			1451.259	1	1451.259	12.686	.001
SEX			9.628	1	9.628	.084	.773
ARTR			3.874	1	3.874	.034	.855
ARTF			9.536	1	9.536	.083	.774
2-WAY INTERACTIONS			1287.427	6	214.571	1.876	.110
F	SEX		354.597	1	354.597	3.100	.086
F	ARTR		47.509	1	47.509	.415	.523
F	ARTF		5.156	1	5.156	.045	.833
SEX	ARTR		70.451	1	70.451	.616	.437
SEX	ARTF		50.205	1	50.205	.439	.512
ARTR	ARTF		544.015	1	544.015	4.755	.035
3-WAY INTERACTIONS			859.437	4	214.859	1.878	.134
F	SEX	ARTR	250.939	1	250.939	2.194	.147
F	ARTR	ARTF	3.645	1	3.645	.032	.859
SEX	ARTR	ARTF	169.945	1	169.946	1.486	.230
EXPLAINED			3699.244	14	264.232	2.310	.020
RESIDUAL			4461.589	39	114.400		
TOTAL			8160.833	53	153.978		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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        A9
     BY F
        SEX
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        ARTF
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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	674.513	4	168.628	3.311	.020
F	645.433	1	645.433	12.673	.001
SEX	28.668	1	28.668	.563	.458
ARTR	1.740	1	1.740	.034	.854
ARTF	5.406	1	5.406	.106	.746
2-WAY INTERACTIONS	535.461	6	89.243	1.752	.135
F SEX	153.992	1	163.992	3.220	.080
F ARTR	29.995	1	29.995	.589	.447
F ARTF	25.904	1	25.904	.509	.480
SEX ARTR	130.277	1	130.277	2.558	.118
SEX ARTF	.273	1	.273	.005	.942
ARTR ARTF	.532	1	.532	.010	.919
3-WAY INTERACTIONS	127.229	4	31.807	.625	.648
F SEX ARTR	46.091	1	46.091	.905	.347
F SEX ARTF	43.405	1	43.405	.852	.362
F ARTR ARTF	62.587	1	62.587	1.229	.274
SEX ARTR ARTF	.606	1	.606	.012	.914
EXPLAINED	1337.204	14	95.515	1.875	.061
RESIDUAL	1996.222	39	50.929		
TOTAL	3323.426	53	62.706		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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        A10
     BY F
        SEX
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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	62.131	4	15.533	2.389	.067
F	11.313	1	11.313	1.740	.195
SEX	24.050	1	24.050	3.699	.062
ARTR	.393	1	.383	.059	.810
ARTF	12.224	1	12.224	1.880	.178
2-WAY INTERACTIONS	27.785	6	4.631	.712	.642
F SEX	6.100	1	6.100	.938	.339
F ARTR	9.690	1	9.690	1.490	.230
F ARTF	10.033	1	10.033	1.543	.222
SEX ARTR	2.130	1	2.130	.328	.570
SEX ARTF	.089	1	.089	.014	.908
ARTR ARTF	1.476	1	1.476	.227	.636
3-WAY INTERACTIONS	38.815	4	9.704	1.492	.223
F SEX ARTR	.153	1	.153	.024	.879
F SEX ARTF	14.593	1	14.593	2.244	.142
F ARTR ARTF	14.549	1	14.549	2.238	.143
SEX ARTR ARTF	5.879	1	5.879	.904	.348
EXPLAINED	128.731	14	9.195	1.414	.193
RESIDUAL	253.583	39	6.502		
TOTAL	392.315	53	7.213		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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        A11
     BY F
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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	493.935	4	120.984	2.201	.087
F	265.812	1	265.812	4.836	.034
SEX	61.768	1	61.768	1.124	.296
ARTR	26.136	1	26.136	.475	.495
ARTF	180.309	1	180.309	3.280	.078
2-WAY INTERACTIONS	354.294	6	59.049	1.074	.394
F SEX	172.243	1	172.243	3.133	.085
F ARTR	51.015	1	51.016	.928	.341
F ARTF	23.768	1	23.768	.432	.515
SEX ARTR	77.472	1	77.472	1.409	.242
SEX ARTF	1.941	1	1.941	.035	.852
ARTR ARTF	14.857	1	14.857	.270	.606
3-WAY INTERACTIONS	237.964	4	59.491	1.082	.379
F SEX ARTR	10.371	1	10.371	.189	.666
F SEX ARTF	3.090	1	3.090	.056	.814
F ARTR ARTF	86.184	1	86.184	1.568	.218
SEX ARTR ARTF	65.565	1	65.565	1.193	.281
EXPLAINED	1076.194	14	76.871	1.398	.200
RESIDUAL	2143.806	39	54.969		
TOTAL	3220.000	53	60.755		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	337.459	4	84.365	1.604	.193
F	70.522	1	70.522	1.341	.254
SEX	108.410	1	108.410	2.062	.159
ARTR	78.829	1	78.829	1.499	.228
ARTF	10.859	1	10.859	.207	.652
2-WAY INTERACTIONS	148.895	6	24.816	.472	.825
F SEX	21.034	1	21.034	.400	.531
F ARTR	37.676	1	37.676	.716	.402
F ARTF	21.673	1	21.673	.412	.525
SEX ARTR	29.359	1	29.359	.558	.459
SEX ARTF	5.205	1	5.205	.099	.755
ARTR ARTF	37.802	1	37.802	.719	.402
3-WAY INTERACTIONS	404.224	4	101.056	1.922	.126
F SEX ARTR	197.593	1	197.593	3.758	.060
F SEX ARTF	105.757	1	105.757	2.011	.164
F ARTR ARTF	169.236	1	169.236	3.218	.081
SEX ARTR ARTF	345.000	1	345.000	6.561	.014
EXPLAINED	890.578	14	63.613	1.210	.307
RESIDUAL	2050.756	39	52.583		
TOTAL	2941.333	53	55.497		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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A13
BY F
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			31.476	4	7.869	1.652	.181
F			3.070	1	3.070	.644	.427
SEX			6.918	1	6.918	1.452	.235
ARTR			10.762	1	10.762	2.259	.141
ARTF			16.252	1	16.252	3.411	.072
2-WAY INTERACTIONS			16.392	6	2.732	.573	.749
F	SEX		2.440	1	2.440	.512	.478
F	ARTR		.307	1	.307	.064	.801
F	ARTF		14.424	1	14.424	3.028	.090
SEX	ARTR		.065	1	.065	.014	.907
SEX	ARTF		3.579	1	3.579	.751	.391
ARTR	ARTF		.559	1	.559	.117	.734
3-WAY INTERACTIONS			29.096	4	7.271	1.526	.214
F	SEX	ARTR	5.121	1	5.121	1.075	.306
F	SEX	ARTF	.069	1	.069	.015	.905
F	ARTR	ARTF	3.912	1	3.912	.821	.370
SEX	ARTR	ARTF	6.248	1	6.248	1.311	.259
EXPLAINED			76.954	14	5.497	1.154	.347
RESIDUAL			185.806	39	4.764		
TOTAL			262.759	53	4.958		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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BY F
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			1.855	4	.464	.350	.842
F			1.802	1	1.802	1.361	.250
SEX			.000	1	.000	.000	.995
ARTR			.092	1	.092	.070	.793
ARTF			.022	1	.022	.016	.899
2-WAY INTERACTIONS			24.016	6	4.003	3.024	.016
F	SEX		4.616	1	4.616	3.488	.069
F	ARTR		4.399	1	4.399	3.323	.076
F	ARTF		2.332	1	2.332	1.762	.192
SEX	ARTR		1.731	1	1.731	1.308	.260
SEX	ARTF		5.651	1	5.651	4.270	.045
ARTR	ARTF		5.958	1	5.958	4.502	.040
3-WAY INTERACTIONS			9.773	4	2.443	1.846	.140
F	SEX	ARTR	.835	1	.835	.631	.432
F	SEX	ARTF	3.972	1	3.972	3.001	.091
F	ARTR	ARTF	6.528	1	6.528	4.932	.032
SEX	ARTR	ARTF	1.363	1	1.363	1.030	.316
EXPLAINED			35.643	14	2.546	1.924	.054
RESIDUAL			51.617	39	1.324		
TOTAL			87.259	53	1.646		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A16
BY F
SEX
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			28.409	4	7.102	.154	.960
F			9.124	1	9.124	.198	.659
SEX			5.784	1	5.784	.125	.725
ARTR			.677	1	.677	.015	.904
ARTF			16.933	1	16.933	.367	.548
2-WAY INTERACTIONS			319.036	6	53.173	1.153	.351
F	SEX		194.074	1	194.074	4.210	.047
F	ARTR		25.339	1	25.339	.550	.463
F	ARTF		2.382	1	2.382	.052	.821
SEX	ARTR		3.744	1	3.744	.081	.777
SEX	ARTF		4.412	1	4.412	.096	.759
ARTR	ARTF		55.073	1	55.073	1.195	.281
3-WAY INTERACTIONS			73.264	4	18.316	.397	.809
F	SEX	ARTR	49.093	1	49.093	1.065	.308
F	SEX	ARTF	2.490	1	2.490	.054	.817
F	ARTR	ARTF	29.957	1	29.957	.650	.425
SEX	ARTR	ARTF	15.260	1	15.260	.331	.568
EXPLAINED			420.709	14	30.051	.652	.805
RESIDUAL			1798.050	39	46.104		
TOTAL			2218.759	53	41.863		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

A17
BY F
SEX
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			43.286	4	10.821	.356	.838
F			6.794	1	6.794	.224	.639
SEX			37.749	1	37.749	1.243	.272
ARTR			.003	1	.003	.000	.992
ARTF			4.753	1	4.753	.156	.695
2-WAY INTERACTIONS			531.031	6	88.505	2.914	.019
F	SEX		395.282	1	395.282	13.013	.001
F	ARTR		57.317	1	57.317	1.887	.177
F	ARTF		11.749	1	11.749	.387	.538
SEX	ARTR		18.621	1	18.621	.513	.438
SEX	ARTF		7.400	1	7.400	.244	.624
ARTR	ARTF		1.121	1	1.121	.037	.849
3-WAY INTERACTIONS			116.910	4	29.227	.962	.439
F	SEX	ARTR	29.593	1	29.593	.974	.330
F	SEX	ARTF	.084	1	.084	.003	.958
F	ARTR	ARTF	2.633	1	2.633	.087	.770
SEX	ARTR	ARTF	18.581	1	18.581	.612	.439
EXPLAINED			691.226	14	49.373	1.625	.115
RESIDUAL			1184.700	39	30.377		
TOTAL			1875.926	53	35.395		

A18
BY F
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			2.540	4	.635	.044	.996
F			1.023	1	1.023	.072	.790
SEX			.114	1	.114	.008	.929
ARTR			1.932	1	1.932	.135	.715
ARTF			.093	1	.093	.006	.936
2-WAY INTERACTIONS			145.475	6	24.246	1.698	.147
F	SEX		1.945	1	1.945	.136	.714
F	ARTR		54.772	1	54.772	3.837	.057
F	ARTF		.100	1	.100	.007	.934
SEX	ARTR		3.756	1	3.756	.263	.611
SEX	ARTF		43.276	1	43.276	3.031	.090
ARTR	ARTF		43.221	1	43.221	3.028	.090
3-WAY INTERACTIONS			30.862	4	7.715	.540	.707
F	SEX	ARTR	.371	1	.371	.026	.873
F	SEX	ARTF	3.090	1	3.090	.216	.644
F	ARTR	ARTF	8.825	1	8.825	.618	.436
SEX	ARTR	ARTF	12.796	1	12.796	.896	.350
EXPLAINED			178.876	14	12.777	.895	.570
RESIDUAL			556.772	39	14.276		
TOTAL			735.648	53	13.880		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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A21
BY F
SEX
ARTR
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			28.681	4	7.170	.817	.522
F			18.015	1	18.015	2.053	.160
SEX			4.933	1	4.933	.562	.458
ARTR			.314	1	.314	.036	.851
ARTF			1.263	1	1.263	.144	.706
2-WAY INTERACTIONS			15.857	6	2.644	.301	.932
F	SEX		3.079	1	3.079	.351	.557
F	ARTR		1.254	1	1.254	.143	.707
F	ARTF		4.619	1	4.619	.526	.472
SEX	ARTR		2.275	1	2.275	.259	.614
SEX	ARTF		2.194	1	2.194	.250	.620
ARTR	ARTF		.375	1	.375	.043	.837
3-WAY INTERACTIONS			40.900	4	10.225	1.165	.341
F	SEX	ARTR	.121	1	.121	.014	.907
F	SEX	ARTF	.405	1	.405	.046	.831
F	ARTR	ARTF	34.112	1	34.112	3.887	.056
SEX	ARTR	ARTF	.780	1	.780	.089	.767
EXPLAINED			85.443	14	6.103	.695	.765
RESIDUAL			342.256	39	8.776		
TOTAL			427.704	53	8.070		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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CREATA
BY F
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ARTF

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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			2575.648	4	643.912	.815	.524
F			2503.820	1	2503.820	3.167	.083
SEX			16.800	1	16.800	.021	.885
ARTR			1.891	1	1.891	.002	.961
ARTF			.767	1	.767	.001	.975
2-WAY INTERACTIONS			5866.709	6	977.785	1.237	.309
F	SEX		4428.900	1	4428.900	5.603	.023
F	ARTR		401.345	1	401.345	.508	.480
F	ARTF		203.093	1	203.093	.257	.615
SEX	ARTR		80.763	1	80.763	.102	.751
SEX	ARTF		6.551	1	6.551	.008	.928
ARTR	ARTF		295.918	1	295.918	.374	.544
3-WAY INTERACTIONS			5038.279	4	1259.569	1.593	.195
F	SEX	ARTR	3998.502	1	3998.502	5.058	.030
F	SEX	ARTF	988.016	1	988.016	1.250	.270
F	ARTR	ARTF	53.847	1	53.847	.068	.795
SEX	ARTR	ARTF	59.645	1	59.645	.075	.785
EXPLAINED			13480.633	14	962.902	1.218	.302
RESIDUAL			30830.200	39	790.518		
TOTAL			44310.833	53	836.053		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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F1A
BY F
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ARTF

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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			5428.750	4	1357.187	2.365	.031
F			4745.823	1	4745.823	8.755	.005
SEX			30.566	1	30.566	.056	.814
ARTR			72.423	1	72.423	.134	.717
ARTF			1227.828	1	1227.828	2.265	.140
2-WAY INTERACTIONS			5145.085	6	857.514	1.582	.178
F	SEX		1959.467	1	1959.467	3.615	.065
F	ARTR		1070.726	1	1070.726	1.975	.168
F	ARTF		58.332	1	58.332	.108	.745
SEX	ARTR		111.786	1	111.786	.206	.652
SEX	ARTF		37.924	1	37.924	.070	.793
ARTR	ARTF		1209.306	1	1209.306	2.231	.143
3-WAY INTERACTIONS			5573.013	4	1393.253	2.570	.053
F	SEX	ARTR	47.280	1	47.280	.087	.769
F	SEX	ARTF	275.862	1	275.862	.509	.480
F	ARTR	ARTF	2361.315	1	2361.315	4.356	.043
SEX	ARTR	ARTF	3454.599	1	3454.599	6.373	.015
EXPLAINED			17146.848	14	1224.775	2.259	.023
RESIDUAL			21140.633	39	542.068		
TOTAL			38287.481	53	722.405		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

F3A
BY F
SEX
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			4904.355	4	1226.089	2.410	.066
F			4778.666	1	4778.665	9.391	.004
SEX			116.648	1	116.648	.229	.635
ARTR			5.798	1	5.799	.011	.916
ARTF			49.818	1	49.818	.098	.756
2-WAY INTERACTIONS			7592.080	6	1263.680	2.483	.039
F	SEX		4233.631	1	4283.631	8.418	.006
F	ARTR		623.700	1	623.700	1.226	.275
F	ARTF		5.708	1	5.709	.011	.916
SEX	ARTR		679.003	1	679.003	1.334	.255
SEX	ARTF		7.770	1	7.770	.015	.902
ARTR	ARTF		199.223	1	199.223	.392	.535
3-WAY INTERACTIONS			2619.774	4	654.944	1.287	.292
F	SEX	ARTR	1230.371	1	1230.371	2.418	.128
F	SEX	ARTF	159.688	1	159.688	.314	.579
F	ARTR	ARTF	97.075	1	97.075	.191	.665
SEX	ARTR	ARTF	202.173	1	202.173	.397	.532
EXPLAINED			15106.209	14	1079.015	2.121	.033
RESIDUAL			19844.772	39	508.840		
TOTAL			34950.981	53	659.452		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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B2
BY H
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ARTF

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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	52.892	4	13.223	.105	.980
H	34.176	1	34.176	.271	.606
SEX	.531	1	.531	.004	.949
ARTR	5.752	1	5.752	.046	.832
ARTF	.209	1	.209	.002	.968
2-WAY INTERACTIONS	554.796	6	92.466	.733	.626
H SEX	.506	1	.506	.004	.950
H ARTR	346.228	1	346.228	2.745	.106
H ARTF	54.287	1	54.287	.430	.516
SEX ARTR	13.782	1	13.782	.109	.743
SEX ARTF	76.994	1	76.994	.610	.440
ARTR ARTF	9.712	1	9.712	.077	.783
3-WAY INTERACTIONS	1350.547	4	487.637	3.866	.010
H SEX ARTR	695.523	1	695.523	5.514	.024
H SEX ARTF	358.839	1	358.839	2.845	.100
H ARTR ARTF	1788.017	1	1788.017	14.174	.001
SEX ARTR ARTF	607.321	1	607.321	4.814	.034
EXPLAINED	2558.235	14	182.731	1.449	.178
RESIDUAL	4919.765	39	126.148		
TOTAL	7478.000	53	141.094		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

B4
BY H
SEX
ARTR
ARTF

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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	755.375	4	188.844	.998	.420
H	73.511	1	73.511	.389	.537
SEX	12.655	1	12.655	.067	.797
ARTR	453.972	1	453.972	2.400	.129
ARTF	114.842	1	114.842	.607	.441
2-WAY INTERACTIONS	1357.879	6	226.313	1.196	.329
H SEX	233.690	1	233.690	1.235	.273
H ARTR	56.006	1	56.006	.296	.589
H ARTF	13.072	1	13.072	.069	.794
SEX ARTR	640.036	1	640.036	3.383	.073
SEX ARTF	959.776	1	959.776	5.073	.030
ARTR ARTF	13.828	1	13.828	.073	.788
3-WAY INTERACTIONS	525.235	4	131.309	.694	.601
H SEX ARTR	152.758	1	152.758	.807	.374
H SEX ARTF	264.499	1	264.499	1.398	.244
H ARTR ARTF	23.945	1	23.945	.127	.724
SEX ARTR ARTF	2.348	1	2.348	.012	.912
EXPLAINED	2638.489	14	188.464	.996	.476
RESIDUAL	7377.826	39	189.175		
TOTAL	10016.315	53	188.987		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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95
BY H
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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	79.775	4	19.944	.744	.568
H	.551	1	.551	.021	.887
SEX	.414	1	.414	.015	.902
ARTR	73.251	1	73.251	2.731	.106
ARTF	.230	1	.230	.009	.927
2-WAY INTERACTIONS	115.092	6	19.182	.715	.640
H SEX	3.211	1	3.211	.120	.731
H ARTR	26.204	1	26.204	.977	.329
H ARTF	4.369	1	4.369	.163	.689
SEX ARTR	76.300	1	76.300	2.845	.100
SEX ARTF	8.366	1	8.366	.312	.580
ARTR ARTF	.156	1	.156	.006	.940
3-WAY INTERACTIONS	174.253	4	43.563	1.624	.188
H SEX ARTR	.835	1	.835	.031	.861
H SEX ARTF	.915	1	.915	.034	.854
H ARTR ARTF	118.639	1	118.639	4.423	.042
SEX ARTR ARTF	3.045	1	3.045	.114	.738
EXPLAINED	369.120	14	26.366	.983	.488
RESIDUAL	1046.083	39	26.823		
TOTAL	1415.204	53	26.702		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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37
BY H
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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	151.010	4	37.752	.737	.573
H	25.914	1	25.914	.506	.481
SEX	.001	1	.001	.000	.997
ARTR	146.415	1	146.415	2.856	.099
ARTF	17.121	1	17.121	.334	.567
2-WAY INTERACTIONS	739.461	6	123.243	2.404	.045
H SEX	399.018	1	399.018	7.589	.009
H ARTR	62.318	1	62.318	1.216	.277
H ARTF	50.044	1	50.044	.976	.329
SEX ARTR	101.352	1	101.352	1.977	.168
SEX ARTF	20.947	1	20.947	.409	.526
ARTR ARTF	86.052	1	86.052	1.679	.203
3-WAY INTERACTIONS	573.264	4	143.316	2.796	.039
H SEX ARTR	365.002	1	365.002	7.121	.011
H SEX ARTF	13.568	1	13.568	.265	.610
H ARTR ARTF	5.783	1	5.783	.113	.739
SEX ARTR ARTF	85.306	1	85.306	1.664	.205
EXPLAINED	1463.735	14	104.552	2.040	.040
RESIDUAL	1999.098	39	51.259		
TOTAL	3462.833	53	65.336		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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B14
BY H
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SOURCE OF VARIATION				SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS				2.660	4	.665	2.239	.082
H				1.494	1	1.494	5.030	.031
SEX				.018	1	.018	.060	.808
ARTR				1.236	1	1.236	4.163	.048
ARTF				.181	1	.181	.611	.439
2-WAY INTERACTIONS				3.455	6	.576	1.939	.099
H	SEX			.036	1	.036	.121	.730
H	ARTR			.508	1	.508	1.710	.199
H	ARTF			1.642	1	1.642	5.528	.024
SEX	ARTR			.000	1	.000	.000	.985
SEX	ARTF			.000	1	.000	.000	.990
ARTR	ARTF			.877	1	.877	2.953	.094
3-WAY INTERACTIONS				1.116	4	.279	.940	.451
H	SEX	ARTR		.009	1	.008	.026	.874
H	SEX	ARTF		.047	1	.047	.159	.692
H	ARTR	ARTF		.960	1	.960	3.232	.080
SEX	ARTR	ARTF		.016	1	.016	.055	.816
EXPLAINED				7.231	14	.517	1.739	.087
RESIDUAL				11.583	39	.297		
TOTAL				18.815	53	.355		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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B15
BY H
SEX
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ARTF

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SOURCE OF VARIATION				SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS				.535	4	.134	.219	.926
H				.185	1	.185	.303	.585
SEX				.013	1	.013	.021	.886
ARTR				.419	1	.419	.687	.412
ARTF				.119	1	.119	.196	.661
2-WAY INTERACTIONS				7.940	6	1.323	2.169	.067
H	SEX			.048	1	.048	.078	.781
H	ARTR			4.183	1	4.183	6.856	.013
H	ARTF			3.556	1	3.556	5.828	.021
SEX	ARTR			.016	1	.016	.026	.872
SEX	ARTF			.524	1	.524	.858	.360
ARTR	ARTF			2.590	1	2.590	4.229	.046
3-WAY INTERACTIONS				.989	4	.247	.405	.804
H	SEX	ARTR		.371	1	.371	.608	.440
H	SEX	ARTF		.083	1	.083	.136	.714
H	ARTR	ARTF		.180	1	.180	.295	.590
SEX	ARTR	ARTF		.147	1	.147	.241	.627
EXPLAINED				9.464	14	.676	1.108	.381
RESIDUAL				23.795	39	.610		
TOTAL				33.259	53	.628		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

EUGENIA VAFAIE HEC 2-29-84

FILE DVAF1 (CREATION DATE = 84/09/12.) SVAF2

* * * * * * * * A N A L Y S I S O F V A R I A N C E * * * * * * * *

F18
BY H
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ARTF

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SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	3759.982	3	1253.327	1.195	.322
H	3297.194	1	3297.194	3.143	.083
SEX	73.576	1	73.576	.070	.792
ARTF	310.686	1	310.686	.296	.589
2-WAY INTERACTIONS	4434.326	3	1478.775	1.410	.252
H SEX	1556.710	1	1556.710	1.484	.229
H ARTF	200.699	1	200.699	.191	.664
SEX ARTF	2539.099	1	2539.099	2.420	.127
3-WAY INTERACTIONS	341.330	1	341.330	.325	.571
H SEX ARTF	341.330	1	341.330	.325	.571
EXPLAINED	8537.638	7	1219.663	1.163	.343
RESIDUAL	48258.455	46	1049.097		
TOTAL	56796.093	53	1071.624		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

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BY REWARD
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			149.071	4	37.268	1.796	.149
REWARD			143.713	1	143.713	6.925	.012
ARTRN			3.676	1	3.676	.177	.676
ARTF			1.751	1	1.751	.084	.773
SEX			.012	1	.012	.001	.981
2-WAY INTERACTIONS			113.947	6	18.991	.915	.494
REWARD	ARTRN		4.859	1	4.859	.234	.631
REWARD	ARTF		14.720	1	14.720	.709	.405
REWARD	SEX		9.715	1	9.715	.468	.498
ARTRN	ARTF		3.210	1	3.210	.155	.696
ARTRN	SEX		35.021	1	35.021	1.687	.202
ARTF	SEX		1.700	1	1.700	.082	.776
3-WAY INTERACTIONS			1.533	4	.383	.018	.999
REWARD	ARTRN	ARTF	.503	1	.503	.024	.877
REWARD	ARTRN	SEX	.124	1	.124	.006	.939
REWARD	ARTF	SEX	.004	1	.004	.000	.989
ARTRN	ARTF	SEX	.366	1	.366	.018	.895
EXPLAINED			264.551	14	18.896	.911	.555
RESIDUAL			809.375	39	20.753		
TOTAL			1073.926	53	20.263		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

* * * * * * * * ANALYSIS OF VARIANCE * * * * * * * *

FB
BY REWARD
ARTRN
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SOURCE OF VARIATION			SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS			6.178	4	1.544	.572	.684
REWARD			2.466	1	2.466	.913	.345
ARTRN			.140	1	.140	.052	.821
ARTF			.166	1	.166	.062	.805
SEX			4.103	1	4.103	1.520	.225
2-WAY INTERACTIONS			52.668	6	8.778	3.252	.011
REWARD	ARTRN		6.523	1	6.523	2.416	.128
REWARD	ARTF		12.380	1	12.380	4.586	.039
REWARD	SEX		6.846	1	6.846	2.536	.119
ARTRN	ARTF		1.567	1	1.567	.580	.451
ARTRN	SEX		2.998	1	2.998	1.110	.298
ARTF	SEX		1.896	1	1.896	.702	.407
3-WAY INTERACTIONS			2.704	4	.676	.250	.908
REWARD	ARTRN	ARTF	.128	1	.128	.047	.829
REWARD	ARTRN	SEX	.560	1	.560	.207	.651
REWARD	ARTF	SEX	.253	1	.253	.094	.761
ARTRN	ARTF	SEX	.129	1	.129	.048	.828
EXPLAINED			61.550	14	4.396	1.629	.114
RESIDUAL			105.283	39	2.700		
TOTAL			166.833	53	3.148		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

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BY REWARD
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ARTF
SEX

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	4.053	4	1.013	1.135	.354
REWARD	2.242	1	2.242	2.511	.121
ARTRN	.110	1	.110	.123	.728
ARTF	1.122	1	1.122	1.257	.269
SEX	1.425	1	1.425	1.596	.214
2-WAY INTERACTIONS	10.054	6	1.676	1.877	.110
REWARD ARTRN	.146	1	.146	.163	.689
REWARD ARTF	.001	1	.001	.001	.973
REWARD SEX	5.314	1	5.314	5.951	.019
ARTRN ARTF	.015	1	.015	.017	.896
ARTRN SEX	.071	1	.071	.079	.780
ARTF SEX	1.204	1	1.204	1.349	.253
3-WAY INTERACTIONS	.401	4	.100	.112	.977
REWARD ARTRN ARTF	.002	1	.002	.002	.964
REWARD ARTRN SEX	.157	1	.157	.176	.677
REWARD ARTF SEX	.004	1	.004	.004	.947
ARTRN ARTF SEX	.061	1	.061	.068	.796
EXPLAINED	14.508	14	1.036	1.161	.342
RESIDUAL	34.825	39	.893		
TOTAL	49.333	53	.931		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

OR
BY REWARD
ARTRN
ARTF
SEX

SOURCE OF VARIATION	SUM OF SQUARES	DF	MEAN SQUARE	F	SIGNIF OF F
MAIN EFFECTS	37.097	4	9.274	1.132	.356
REWARD	33.524	1	33.524	4.091	.050
ARTRN	.012	1	.012	.001	.970
ARTF	.712	1	.712	.087	.770
SEX	2.911	1	2.911	.355	.555
2-WAY INTERACTIONS	38.129	6	6.355	.775	.594
REWARD ARTRN	.007	1	.007	.001	.978
REWARD ARTF	3.049	1	3.049	.372	.545
REWARD SEX	29.552	1	29.552	3.606	.065
ARTRN ARTF	.432	1	.432	.053	.820
ARTRN SEX	5.873	1	5.873	.717	.402
ARTF SEX	1.152	1	1.152	.141	.710
3-WAY INTERACTIONS	53.108	4	13.277	1.620	.189
REWARD ARTRN ARTF	24.904	1	24.904	3.039	.089
REWARD ARTRN SEX	15.351	1	15.351	1.873	.179
REWARD ARTF SEX	30.337	1	30.337	3.702	.062
ARTRN ARTF SEX	.482	1	.482	.059	.810
EXPLAINED	128.334	14	9.167	1.119	.373
RESIDUAL	319.592	39	8.195		
TOTAL	447.926	53	8.451		

54 CASES WERE PROCESSED.
0 CASES (0 PCT) WERE MISSING.

VITA 2

M. Eugenia Vafaie

Candidate for the Degree of

Doctor of Philosophy

Thesis: THE EFFECTS OF MONETARY REWARDS ON ARTISTIC CREATIVITY

Major Field: Home Economics - Family Relations and Child Development

Biographical:

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Education: Graduated from Mirabeau Lamar High School, Houston, Texas, in December, 1969; received Bachelor of Science Degree in Education from the University of Houston, in December, 1973; received the Master of Arts Degree in Education from the University of Houston, in August, 1975; completed requirements for the Doctor of Philosophy degree at Oklahoma State University in May, 1985.

Professional Experience: Teaching Assistant, Department of Special Education, University of Houston, January, 1974, to December, 1974; Teacher, Calcasieu Parish School Board, Lake Charles, Louisiana Department of Special Services, August, 1975, to August, 1978; Head Teacher, Highland Park United Methodist Church, Stillwater, Oklahoma, August, 1978, to May, 1980; Graduate

Research Assistant and Associate, Department of Family Relations and Child Development, Oklahoma State University, August, 1980, to May, 1983; Assistant Professor, Depatment of Home Economics, Central Michigan University, August, 1983, to May, 1984; Teaching Associate, Oklahoma State University, August, 1984, to December, 1984; Assistant Professor and Director, Child Development Center, Alabama A&M University, January, 1985, to present.