

REWARDS, LOCUS OF CONTROL AND IDEATIONAL FLUENCY
IN PRESCHOOL CHILDREN

by

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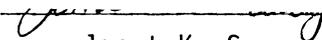
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CHAPTER 1

Introduction and Review of Literature

With the recognition that original solutions are needed to solve the complex problems facing society (Guilford, 1968), interest in creativity has increased (Barron & Harrington, 1981). Most of the research has been with subjects of school-age through adulthood (Arasteh & Arasteh, 1976). The importance of early childhood experiences in determining later functioning has stimulated research interest in creativity of the young child (Moran, Milgram, Sawyers & Fu, 1983a; Moran, Sawyers & Fu, 1983; Ward, 1968, 1969). Research with the young child is needed to formulate a theory of creativity that is developmental in scope (Kogan, 1983).

Creativity has been linked both theoretically and empirically to a wide variety of abilities, processes and personality traits. Factors thought to facilitate or inhibit creativity have also received attention. Two such variables are locus of control and rewards.

Cohen and Oden (1974) suggested a conceptual framework linking the behavioral characteristics of creative individuals with the construct of locus of

control. They suggested that an individual needs to feel in control of the environment in order to be creative. Thus, they argued that characteristics associated with internal orientation are a necessary component of creative functioning.

The effect of rewards and reinforcement on creativity has also received attention. According to a model developed by McGraw (1978) rewards have a detrimental effect on the performance of attractive-heuristic tasks and a facilitating effect on aversive-algorithmic tasks. Still another explanation of the detrimental effect of rewards is that they signify an external source of judgment on and/or control of behavior and thus lower the level of performance (Lepper & Greene, 1978). The use of external rewards can weaken internal motivation and control in those tasks perceived as intrinsically rewarding (Deci, 1978). Within both frameworks, rewards are thought to have a detrimental effect on creativity. The empirical evidence to support this is mixed. One possible explanation appears to be that an individual's locus of control orientation may determine

the effect rewards have on creativity. Therefore, the purpose of this study is to compare the effects of reward on the creativity of subjects identified as having either an external or internal locus of control.

The Wallach and Kogan Model of Creativity

Creativity or divergent thinking has been defined as an individual's ability to produce unique or original responses (Wallach & Kogan, 1965). It is thought to be composed of fluency, flexibility and originality in thought (Guilford, 1968).

Most of the research on creativity has focused on ideational fluency. The three widely used measures of ideational fluency developed by Wallach and Kogan (1965) are the unusual uses, instances and patterns tasks. In the uses task the subject is asked to name all the uses they can think of for a particular object or stimulus (e.g., knife). In the instances task the subject names all the items that have particular characteristic (e.g., square things). The pattern meanings task requires the subject to look at a line drawing and to name all the possible things the pattern could be.

Recent research has indicated adapted forms of these measures can be used successfully with children as young as 4-years-old. Moran, Milgram, Sawyers and Fu (1983b) tested Starkweather's (1964, 1971) hypothesis that three-dimensional abstract shapes were more appropriate stimulus items for use with young children. Starkweather believed that the two-dimensional line drawings used in the pattern meanings task were too abstract for use with young children. A three-dimensional pattern allows the children the opportunity to hold and manipulate the materials. The Moran et al. (1983b) results supported the hypothesis that three dimensional pattern stimuli elicited a greater number of responses than the two dimensional items.

In another series of studies, Sawyers, Moran, Fu & Milgram (1983) looked at stimulus familiarity. A uses task with items judged to be less familiar to preschoolers, (e.g., a newspaper, a coat hanger and a knife) was compared to a uses task with more familiar items (e.g., box, paper and spoon). The findings indicated that the familiar stimulus items generated

greater fluency than the less familiar ones.

The Wallach and Kogan model of creativity, based on the work of Guilford (1956, 1967) and Mednick (1962) proposes that: a) the ability to produce ideas or ideational fluency is the best single measure of divergent responding, b) popular responses are usually given early in the response sequence followed by original responses; original responses are defined as those given by 5% or less of the sample, c) the quantity of ideational output is related to its quality, d) there is a distinction between creativity and intelligence, and e) a nonevaluative atmosphere is necessary for creativity assessment.

Order Effect. Mednick (1962) has postulated that in the sequence of responses there is an order effect. Within this associative hierarchy, popular responses are more likely to be emitted early in the sequence, whereas the original responses occur later in the response series. He also predicted a differential rate of response for high-creative as compared with low-creative individuals.

The generation of these popular ideas tends to

stimulate the production of original solutions. Support for this order effect was found recently in a study with young children by Moran, Milgram, Sawyers & Fu (1983a). They also found the order effect to be more pronounced in children with high ideational fluency scores.

Quantity/Quality. One of the tenets of the Wallach-Kogan model of creativity is that quality of ideational output is directly related to quantity of responses. Unique responses occur later in the sequence of responses. The greater the number of responses (quantity), the increased probability of a unique (quality) response (Kogan, 1983). Thus, the more fluent child, who generates more responses, has an increased likelihood of producing a unique response. Because of this there should be a positive correlation between fluency and uniqueness (Kogan, 1983). However, it is also important to note that quality of responses is closely tied to appropriateness as well as uniqueness (Kogan, 1983). Recent research (Moran, et al., 1983) tends to support Kogan's notion about quantity and quality.

Creativity/Intelligence Distinction. Wallach (1970) reviewed numerous studies which supported the creativity-intelligence distinction. Currently, it is generally assumed that while general intelligence contributes to effective problem-solving, creativity is considered to be relatively independent from IQ. Results of Moran et al. (1983a) study indicated that there is a relationship between popular responses and intelligence but not between original responses and intelligence.

Non-evaluative atmosphere. Testing conditions thought to have an effect on the measurement of creativity have also been investigated. Wallach and Kogan (1965) advocated an evaluation free condition for the optimal assessment of ideational fluency. According to this model, the use of verbal reinforcement, rewards and time limits may violate the evaluation free atmosphere. Time or other limits on responding may inhibit the response hierarchy as conceptualized by Mednick (1962). For example, a situation in which time limits are enforced would not allow the subject the chance to exhaust the response

hierarchy and thus, limit original responses in particular. Therefore, researchers typically do not impose time limits on ideational fluency tasks in an effort to avoid a testlike atmosphere.

Hattie (1977) reviewed conditions under which creativity tests are commonly administered. Hattie's review of the literature presented mixed results in supporting whether gamelike or testlike conditions are better for creativity assessment. These mixed results could in part be due to the various types of creativity tests that were administered, as well as the different age groups and conditions used during assessment. However, Hattie pointed out that one of the criteria for gamelike administration is that the subjects need to feel that they are not being evaluated in terms of a success-failure criterion.

Kogan (1983), summarized the results of studies exploring conditions that either facilitated or hampered creativity assessment. Kogan concluded that the existing evidence does not support the notion of the necessity of an evaluation free setting. In light of these findings, he suggested that practical

considerations favor group administration and time limits. Despite the numerous studies devoted to this issue, Kogan advocated more research to further clarify our understanding. Recent evidence from studies with young children, not cited by Kogan, tend to support the use of a non-evaluative setting (Moran et al., 1983a, 1983b).

Dansky (1979) found that the insertion of a digit span memory (convergent) task was sufficient to break the playful set and to wipe out the benefits of increased ideational fluency for children who had been allowed to play with objects prior to administration of an ideational fluency task. This finding points to the need to separate IQ and other testlike tasks from ideational fluency tasks in such a way as not to break the playful set.

Age and school experience may be influential in a child's perception of a task as evaluative. Williams and Fleming (1969) stated that preschool children in their sample were not affected by an evaluative condition. Recently, Sawyers and Moran (1982) reported that preschoolers often gave shapes, numerals and

letter names in response to pattern meanings tasks. These responses were interpreted to be an attempt by the child to give the "correct" answer to adult questions. The same authors reported that older subjects (9-14 years) were verbally suspicious about directions to ideational fluency task which indicated there were no right or wrong answers. This was particularly true when the task was group administered.

Another non-evaluative atmosphere issue within this framework is the use of material rewards and verbal incentives in creativity testing. Within the Wallach-Kogan model, rewards would be thought to have a detrimental effect on ideational fluency responding because of the violation of the success-failure criterion (Hattie, 1977).

Amabile (1982) investigated the relationship between rewards on the creativity of young females (7 to 11 years of age). The subjects were given the task of making paper collages. Those subjects in the experimental group were told they were competing for prizes whereas those in the control group were told that the prizes would be raffled off. The collages

were judged on creativity by independent raters. Children in the experimental group made collages that were judged less creative than those in the control group. This finding was interpreted as an indication that the experimental group was inhibited in their creativity due to the imposition of judgment or reward.

Johnson (1974) examined the effects of immediate and delayed rewards on disadvantaged and advantaged elementary school children's performance on the Figural Form A of the Torrance Tests of Creative Thinking. Subjects were assigned to either immediate, delayed or non-reward conditions. Disadvantaged subjects scored significantly higher under both reward conditions. However, the scores of the advantaged subjects were higher in the non-reward than either reward condition.

Ward, Kogan and Pankove (1972) looked at the effects of rewards on the ideational fluency of fifth graders. While they found that rewards increased the quantity of responses (total fluency) rewards did not increase the quality (uniqueness) of the responses.

Chambers, Goldman and Kovesdy (1977) used verbal reinforcement on a blockbuilding task with 6 to 8-year

olds. Their results indicated that verbal reinforcement increased creativity, which was loosely defined as the ability to use two or more blocks to develop a specific function or shape as judged by adult raters.

Moran and Liou (1982) studied the effects of monetary reward on college students' creativity. Subjects were also assessed on intelligence. Their findings revealed that reward hindered rather than facilitated performance on the picture completion subtest of the Torrance Tests of Creative Thinking. However, on the circles subtest, reward enhanced performance for students with low intelligence scores, while decreasing scores for students of high intelligence.

Based on the results of a study with fifth graders (Kogan & Morgan, 1969), Kogan (1983) suggested that testlike conditions may indicate to the individual the necessity of a strategy of exhausting a category of responses. For example, when asked to name all the uses for a knife, subjects exhausted all the aspects of the category of cutting (i.e., cutting bread, wood,

paper, etc.). Findings from the 1969 study indicated that rewards increased total fluency (total number of responses), but lowered flexibility scores; total number of categories (e.g., cut, scrape, stab, etc.). Within the Wallach-Kogan model, the increased total fluency, brought on by rewards would be expected to lead to higher quality. In other words, one would expect a greater number of unique responses but this does not appear to be the case (e.g., Ward, Kogan & Pankove, 1972). The reasons for these conflicting results are not clear. Some possible explanations can be found in the various theories concerning the effects of rewards on different types of task performance.

McGraw (1978) developed a two-dimensional model to explain the effect of rewards on different types of tasks. In this model, McGraw postulated that tasks which are attractive or intrinsically satisfying to the subject are detrimentally affected by rewards, whereas unattractive-aversive task performances are facilitated by the use of rewards. McGraw felt the aversive-attractive dimension provided an incomplete explanation of the effects of rewards. Thus, he added

the algorithmic-heuristic dimension. Tasks that are algorithmic in nature are characterized by memory skills, whereas heuristic tasks require insight and innovation. Along this dimension, rewards are thought to have a detrimental effect on the performance of heuristic tasks and a facilitating effect on algorithmic ones.

In applying this model to creativity, ideational fluency tasks would appear to be attractive-heuristic ones and thus one would predict that rewards would have a detrimental effect on performance. However, the empirical evidence (Moran & Liou, 1982) testing this notion is discussed previously.

Lepper and Greene (1978) proposed that a person's intrinsic interest in a task would decrease with exposure to some extrinsic reward for that activity. This overjustification hypothesis was based on earlier work by Lepper, Greene and Nisbett (1973). Lepper, Greene and Nisbett found that when children were rewarded for a task that was judged as being intrinsically motivating, later interest in that task declined significantly. These earlier findings were

replicated by Loveland and Olley (1979).

Another possible explanation maybe the distraction hypothesis (Spence, 1970, 1971). According to this hypothesis the physical presence of reward itself produces distraction leading to decreased performance of the task. This model assumes that the reward distracts the subjects attention from the task at hand.

These theories offer possible explanations about subject performance on creativity tasks. Still another explanation might be found in individual differences such as locus of control orientation.

Locus of Control

Locus of control has been defined as an individual's orientation of perceived control of an event or action. A person with internal locus of control views events as being resultant of one's own behavior whereas an individual with external locus of control perceives events as beyond one's control; the result of luck, or fate, or being under the control of others (Rotter, 1966). It is important to note that locus of control is thought to change over time. As children mature and realize the implications of their

actions on the environment they also gain recognition of internal control (Lefcourt, 1976).

The relationship between locus of control and ideational fluency. Guilford (1968) postulated that creativity is influenced by many different factors. He believed that motivational factors should be considered when studying creativity. Cohen and Oden (1974) postulated that creative thinking is dependent upon a perception of control over the environment. They felt that creativity was the actualization of autonomy and would be associated with an internal locus of control. Cohen and Oden (1974) investigated this relationship in kindergarten and second grade children. Locus of control was assessed using a scale developed by Bialer (1961). Ideational fluency was assessed by the uses and instances task as originally developed by Wallach and Kogan (1965) and modified by Ward (1968). They found a positive relationship between ideational fluency and locus of control for second graders but not for kindergarteners. They suggested that the failure to find the predicted relationship at the kindergarten age may have been due to the abstractness of the uses

task.

In a study with preschool children ranging in age from 47 to 57 months, Sawyers and Moran (in press) found a positive relationship, $r = .55$, $p < .03$, between children's original responses on ideational fluency tasks and locus of control. They used an adapted uses and patterns meanings task as the creativity measure and the Preschool and Primary form of the Nowicki-Strickland Scale (Nowicki & Duke, 1974) locus of control assessment. Responses on the ideational fluency tasks were scored using a method that gives non-overlapping scores of quantity and quality. In this method, responses are scored as either popular or original (those given by more or less than 5% of the sample respectively). They suggest that the Cohen and Oden results may have been due to use of stimuli unfamiliar to young children and to the use of overlapping scores of quantity and quality.

Brecher and Denmark (1969) examined the relationship between locus of control and verbal fluency. Subjects were 84 undergraduate females, who were administered Rotter's (1966) I-E Control scale.

The subjects were asked to write as many five letter words starting with the letter C that they could think of in a four minute period. Results showed that internals had greater verbal fluency than externals. Although this study used time limits and no distinction between original and popular responses, it provides further evidence of the relationship between locus of control and general fluency.

The relationship between locus of control and rewards. Inherent in the definition of locus of control is the concept of rewards and reinforcement. Externals perceive reinforcement as beyond their control whereas internals believe that through their behavior they gain reinforcement (Rotter, 1966). The expectancy of external or internal reward is defined as perceived control (Lefcourt, 1976).

Dollinger and Thelen (1978) examined the relationship between various types of rewards on young children's intrinsic motivation. Children were assigned to one of four treatment conditions--tangible, verbal, symbolic, and self-administered rewards. Children were then asked to solve mazes under the

assigned treatment conditions. Subsequently the children were given a free play period in which they could solve more mazes or try other materials. Following the free play period intrinsic motivation was assessed by using an informal interview and locus of control was assessed by the Stanford Preschool Internal-External Scale (Mischel, Zeiss & Zeiss, 1974). The authors reported that during free play children in the tangible and self-reward conditions showed less intrinsic motivation than children in the other conditions. They also reported rewards did not differentially affect locus of control expectancies.

Howell and Gregory (1980) looked at effects of locus of control and rewards with fifth graders. Locus of control was assessed using the Intellectual Achievement Responsibility Scale. Children were assigned to a reward or aversive (punishment) condition and then given a digit-symbol coding (convergent) task to complete. Internals outscored externals regardless of treatment condition.

Research examining the relationship between locus of control and rewards is sparse, and what research there

is reports mixed results. Further research is needed to clarify these results.

Summary

The research findings provide support for the Wallach and Kogan model of creativity. It has been demonstrated that creativity is measurable in children as young as four-years of age. These children are capable of giving original, high quality responses on adapted ideational fluency tasks.

Recent studies have shown that internal locus of control is significantly related to original responses on ideational fluency tasks for four-year-olds and to total fluency in older subjects. The evidence of the effects of rewards on the fluency, flexibility and originality of responses is inconclusive. However, research suggests that rewards should have a detrimental effect on ideational fluency tasks. Thus more research is needed to clarify the theoretical and empirical links between rewards, locus of control and an individual's ideational fluency.

CHAPTER 2

Methodology

Hypotheses

The purpose of this study was to examine the effects of rewards on the ideational fluency of young children with internal locus of control as compared with those with an external orientation. More specifically, the hypotheses to be tested were as follows:

1) Based on Sawyers' and Moran's (in press) recent finding that internal locus of control was significantly related to original responses, it was hypothesized that children with internal locus of control would score significantly higher on original responses to ideational fluency tasks than children with external locus of control.

2) Since inconclusive findings have been reported on the relationship between total ideational fluency and locus of control (Cohen & Oden, 1974) and popular ideational fluency scores and locus of control scores (Sawyers & Moran, in press), and since no study is known relating flexibility scores to locus of control it was not possible to test the research hypotheses.

Therefore, it was hypothesized that there would be no mean difference between internal and external subjects on total fluency, popular or flexibility scores.

3) Kogan (1983) cited evidence which suggested that testlike conditions increased total fluency but lowered flexibility scores. He speculated that the flexibility scores were lowered due to a strategy in which subjects exhausted a category (e.g. cutting bread, wood, paper, etc.). If one assumes that rewards create a testlike atmosphere one would predict that children receiving rewards would score significantly higher on total fluency and popular responses and;

4) the non-reward group would score significantly higher than the reward group on flexibility and originality.

Since rewards are thought to have a differential effect on the popular and original scores which comprise total fluency it was difficult to predict the possible interaction effects of rewards and locus of control on this score, as well as flexibility scores. It was also difficult to predict how or if rewards would affect subjects differentially based on their

locus of control orientation. In general, it was expected that the effect upon an individual's score on the ideational fluency tasks would depend on which had the greater effect, reward or locus of control. Some of the possible interactions based on previous research are summarized in Figure 1.

Interactions	Popular (algorithmic)	Original (heuristic)	Flexibility
Internal-Reward	(+) In number of responses (Ward, Kogan & Pankove, 1972) ----- Dependent upon which has greater rewards or internal control (-) Internals would resist rewards (Phares, 1976).	(-) Overjustification theory--(Lepper & Greene, 1978). Rewards interfere with internally motivating tasks. Creativity intrinsically motivating (McGraw, 1978, Moran & Liou, 1982) thus decreasing original scores ----- Distraction--individual focuses on rewards and shifts to popular responses.	(-) Same reason--may lead to decrease in flexibility scores ----- Kogan (1983) rewards signal need to exhaust categories (Kogan & Morgan, 1969)
Internal-Non-Rewards	(0) Sawyers & Moran (in press)	(+) Sawyers & Moran (1982). Originality significantly related to internality	(0) Don't know Hypothesize no difference
External-Rewards	(+) Rewards acts as incentive for external subjects--better performance (Rotter (1966), Phares (1976). Also rewards for behavior should increase it (Rotter, 1966). (Also Ward, Kogan & Pankove, 1972)	(-) Don't know--no study to base it on. However, main effects of issues of control and rewards indicates because of distraction & Sawyers & Moran (1983) findings.	(-) Possible b/c of need to exhaust categories (Kogan, 1983).
External-Non-Rewards	(0) Sawyers & Moran (1982)	(-) Sawyers & Moran ----- No motivation for subjects to perform (Rotter, 1966)	(0) Don't know--no studies hypothesize no difference

Key

- (0) = no effect
 (+) = positive effect
 (-) = negative effect

Note 1. Total Fluency--Scores in this area will depend upon individual scores on popular and original scores--also whether tasked is perceived as algorithmic or heuristic by individual. Also no studies have looked at locus of control, rewards and creativity together to base hypotheses on.

Figure 1. Possible Interaction Effects Between Locus of Control and Reward on Ideational Fluency

Subjects

The sample for this study consisted of 43 children between 4- and 5-years of age. The children were selected from two private child care centers in the Blacksburg, Virginia area. The directors were contacted with information concerning the study in order to secure their cooperation with the study. The parents of the children were then contacted by letter in order to gain their permission for their child to participate in the study (Appendix A).

Instrumentation

Locus of control. The Preschool and Primary Nowicki-Strickland Internal-External Scale, PPNS-IE, (Nowicki & Duke, 1974) as shown in Appendix B was administered to assess locus of control. The PPNS-IE, developed specifically for children 4- to 8-years of age, consists of 26 cartoon drawings of two children. One child figure is shown asking a "yes" or "no" question of the other figure. The PPNS-IE has a male and female form. The only difference between the two is that the respondent figure is the same sex as the subject. The PPNS-IE is keyed for externality (see

Appendix B). The possible range of scores is from zero (internal orientation) to twenty-six (external orientation).

Ideational fluency. To assess ideational fluency, two measures were used. A patterns task consisting of three-dimensional styrofoam stimuli, originally developed by Starkweather (1964) and modified by Moran et al. (1983a) were used. The specific stimuli used are shown in Appendix C.

The second measure of ideational fluency was a uses task. The child was asked to name all the uses they could think of for a box and paper. Responses to both tasks were recorded verbatim by the examiner on scoring sheets (Appendix D). All responses were coded as either original (given by 5% or less of the total study sample) or popular (given by more than 5% of the sample). Repeat (those given more than once by the same child) and bizarre responses were not coded. Total fluency was computed by adding the number of popular and original responses. Flexibility scores were derived from protocols for the picture completion subtest of the Torrance Test of Creative Thinking,

Figural Form A (Torrance, 1974). For data analysis the popular, total fluency, flexibility and original scores were summed across the uses and patterns tasks.

Intelligence. Based on the Moran and Liou (1982) findings which indicated that rewards facilitated the performance of students with low IQ, the revised Peabody Picture Vocabulary Test assessment was also administered. The PPVT-R consists of 175 pages of four test items each, arranged in order of increasing difficulty. The subject was asked to select the picture that best illustrated the meaning of a stimulus word presented orally by the examiner.

Rewards. For purposes of this study rewards were used for the treatment condition. These rewards were Chemtoy Wonder bubbles (8 fluid ozs.) and Crayola crayons (eight crayon package).

Procedures and Administration

Prior to data collection, the examiner spent time with the children to establish rapport. The data collection was conducted in two phases. In the first phase the subjects were individually administered the locus of control and intelligence measures. The

standardized administration procedure was followed for both assessments. The internal-external classification was based on a median split on the scores of the sample.

In order to control for examiner bias, an outside researcher scored subjects locus of control and assigned them to treatment conditions. The scores ranged from 9 to 17. Subjects with a score of 13 or less were classified as internal whereas those scoring above 14 were classified as external. Within each locus of control classification, either 10 or 11 subjects were assigned to either a reward or non-reward condition. The resulting four groups were labelled as follows: internal-locus of control non-reward group, internal-locus of control reward group, external-locus of control non-reward group and external-locus of control reward group. The four groups were matched as closely as possible for age and sex.

The ideational fluency tasks were administered in a second session one to three weeks after the completion of first phase. In order to prevent contamination of the non-reward groups by the reward

groups, the non-reward group was tested first at each center.

Prior to the administration of the ideational fluency tasks children in the reward condition received the following instructions: "For these games we have some prizes. Here they are. If you do well enough which one would you like? We will put your name on it and put it aside for you. Next week after we finish I'll tell you if you get the prize." All children who were enrolled at the centers, regardless of participation, group or performance were given their choice of a toy upon completion of the study. A letter was sent home with the child explaining the toy as a gift thanking the child for helping with the study (see Appendix E).

The examiner engaged the children in a warm-up task prior to the actual ideational fluency testing. The warm-up task consisted of stimulus items not being used in the data analysis. Children were given the same directions they received during the actual tasks. The uses task was administered first. Children were asked to tell all the uses they could think of for a

box and paper. If a child ceased to respond, questions were asked such as "Is there anything else you can think of?" There were no time constraints in regard to how long the child had to respond. Next the children were given two three-dimensional pattern and told: "Here is a shape. You can turn it anyway you like to. Tell me all the things you think it can be." If the child ceased to respond, questions similar to those used during the uses task were again asked. All responses were recorded verbatim by the examiner.

Design and Data Analysis

The design of the study was a 2 X 2 design as shown in Figure 2. The between-group variables were internal and external locus of control and reward, non-reward conditions. The dependent variables (total fluency, popular, originality and flexibility scores) were subjected to four separate ANOVA's. Pearson product moment correlations were also run on all the variables.

	Reward	Non-Reward
Internal	n = 11	n = 11
External	n = 11	n = 10

Figure 2. Study Design

CHAPTER 3

Results and Discussion

Results

The purpose of this study was to examine the effects of locus of control and rewards on preschool childrens' ideational fluency. The between-group variables were locus of control (internal, external) and reward (reward, non-reward) and the four dependent variables were popular, original, total fluency and flexibility scores.

Pearson r correlations were computed between the locus of control scores and all the dependent variables. As shown in Table 1, all the dependent variables were significantly related to each other. Locus of control was not found to be significantly related to any of the dependent variables.

The four dependent variables were subjected to separate ANOVA's. The ANOVA's showed no significant effects for locus of control and rewards separately or for the interaction between locus of control and rewards on any of the dependent variables. Means, standard deviations and ranges for all dependent variables by locus of control and reward groups are

presented in Tables 2 and 3. Non-parametric measures (Mann-Whitney U, Kruskal-Wallis) also failed to yield significant effects.

In order to effectively address the findings of this study it was necessary to examine them in light of each hypothesis. The first hypothesis was that internal locus of control scores would have an effect on originality. The mean original score for internal subjects was 13.50 while only 10.24 for external subjects. While this mean difference is in the hypothesized direction it was not significant.

The second hypothesis was that there would be no mean difference between internal and external subjects on total fluency, popular and flexibility scores. The results support this hypothesis.

The third hypothesis was that the reward group would score significantly higher on popular and total fluency than the non-reward subjects. While not significant, the means on popular and total fluency scores for the non-reward group were greater than those for the children in the reward groups (see Table 2). This trend was the opposite of what was suggested by

the third hypothesis.

The fourth hypothesis was that non-reward subjects would score significantly higher on flexibility and originality aspects of ideational fluency than rewarded subjects. The mean differences found between the groups for flexibility and originality are in the predicted direction but not significant (see Table 3). Although not significant, non-reward subjects had higher mean scores than reward subjects for all dependent measures.

No specific hypotheses were made regarding the possible interaction effects of locus of control and rewards on ideational fluency. As there were no main effects and no significant interaction it was not possible to interpret interaction effects.

Discussion

The findings, regarding the relationship among popular, original and total fluency scores are consistent with previous research (Moran, et al., 1983a, 1983b; Sawyers, Moran, Fu & Milgram, 1983). The lack of a correlation between original scores and locus of control does not support the results of earlier

studies (Cohen & Oden, 1974; Sawyers & Moran, in press). A possible explanation may be due, in part, to the distribution of the locus of control scores in the present study. Twenty-three of the 43 subjects scored in the range between 12 to 14.

One possible reason for the finding of no significant difference between the groups on any of the ideational fluency scores may have been the small cell sample size coupled with the large variance. The sample size may have limited the power of the statistical test to deal with the within group variations. For example, the difference between the mean score for the internal reward group for original responses ($\bar{X}=9.91$) and the internal non-reward group ($\bar{X}=17.09$) would appear to be significant. However, the sizable standard deviations (6.59 versus 24.49) appear to have negated the differences in the means.

Summary, Conclusions and Recommendations

Summary

The purpose of this study was to examine the relationship between rewards, locus of control and ideational fluency. Forty-three preschool children were administered the Revised Peabody Picture Vocabulary Test and the Preschool and Primary Nowicki-Strickland Internal-External Scale. Based on a median split of the locus of control measure the children were then assigned to one of four conditions: internal rewards; internal non-rewards; external rewards or external non-rewards. Two ideational fluency tasks, uses and pattern meanings were administered to all the subjects. Pearson r correlations were calculated between locus of control scores and the four ideational fluency scores. Four separate 2 (external, internal) X 2 (reward, non-reward) analysis of variance were conducted for popular, original, total fluency and flexibility scores. Significant correlations were found for all dependent variables. No significant effects were found in any of the analyses.

Conclusions and Recommendations

Based on the data, one would have to conclude that locus of control orientation and rewards have no effect on young children's ideational fluency scores. However, further testing with a larger sample is needed before such conclusions can be drawn. Although the results were not significant, trends were found in the mean differences that suggest support for the hypothesized differential effects.

Recommendations for future research include:

- 1) research with a larger sample to confirm the nonsignificant mean differences between groups found in this study, and
- 2) that a different procedure be used to classify subjects on locus of control to assure a spread in the distribution of scores.

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Table 1
 Pearson Correlation Coefficient Between Dependent
 Variables and Locus of Control

Variable	Original	Total Fluency	Flexibility	Popular
Locus of Control	-.10	-.08	-.06	-.02
Popular	.85*	-.92*	.74	
Flexibility	.73*	.75*		
Total Fluency	.99*			

*p = .0001

Table 2
Means, Standard Deviations and Ranges by Groups for
Popular and Total Fluency Scores

Group	Popular		Total Fluency	
	\bar{X}	Range	\bar{X}	Range
Internal-Reward	10.36 (4.92)*	4-19	20.27 (10.38)	4-44
Internal-Non-Reward	10.82 (8.75)	5-35	27.91 (32.96)	7-118
External-Reward	8.82 (4.68)	4-22	15.91 (12.27)	5-49
External-Non-Reward	12.10 (6.57)	3-25	25.80 (23.18)	8-84

*Standard Deviations in parentheses

Table 3
Means, Standard Deviation and Ranges by Groups for
Original and Flexibility Scores

Group	Original		Flexibility	
	X	Range	X	Range
Internal-Reward	9.91 (6.59)*	1-25	11.91 (4.43)	4-19
Internal-Nonreward	17.09 (24.49)	2-83	14.27 (5.65)	7-24
External-Reward	7.09 (8.10)	1-27	10.91 (4.41)	5-17
External-Nonreward	13.70 (17.41)	1-59	14.00 (7.30)	6-21

*Standard deviation in parenthesis

APPENDIX A
Parent Letter

COLLEGE OF HUMAN RESOURCES



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061 - 8299

DEPARTMENT OF FAMILY AND CHILD DEVELOPMENT

Dear _____

We are conducting a research project on creativity. This project will help us understand the development of creative thought and motivational factors. We would like to ask your cooperation in permitting your child to participate in the project.

Each child will be seen individually by a researcher for two 10-15 minute sessions. Both sessions will take place at your child's school. Your child will be asked to respond to several standardized questions. Since we are interested in the child's thought processes there are no right, wrong, or expected answers to the questions. Your child's name will not be attached to the answer forms to ensure confidentiality.

No child will be forced to participate if he or she does not want to. We will be more than happy to share the results with you upon completion of the research. If you have any questions or reservations and require more information, please contact Melissa Groves or Dr. Sawyers at

Sincerely,

Melissa M. Groves

Dr. Janet Sawyers

Permission Slip

My child, _____ has my permission to participate in the research project concerning the development of children's creative thought.

Child's Birthdate _____

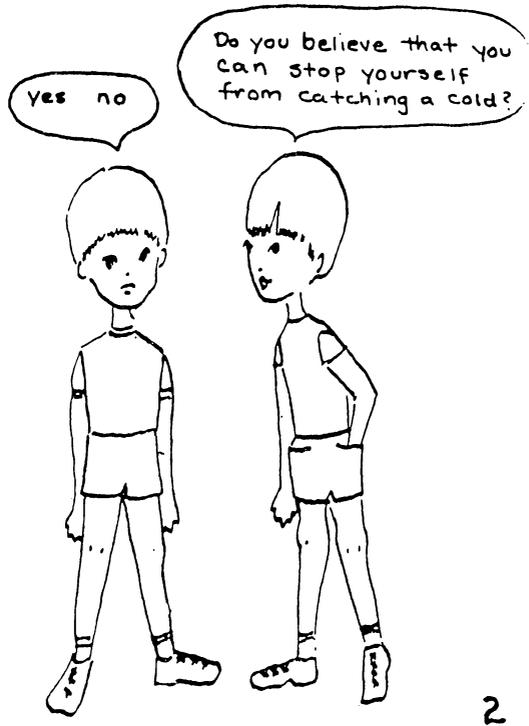
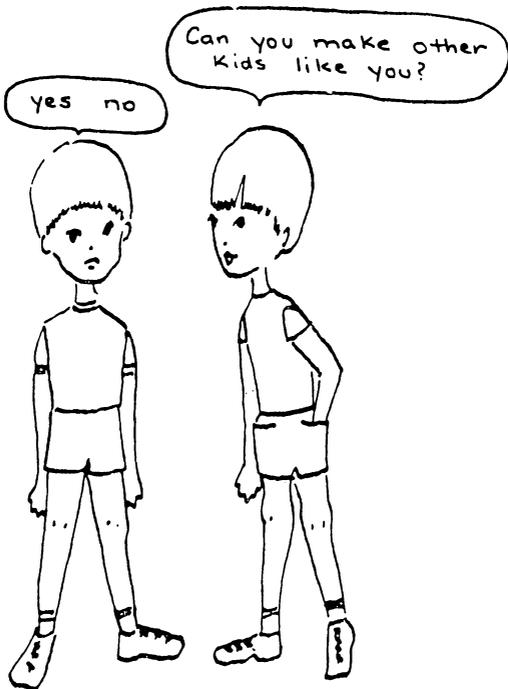
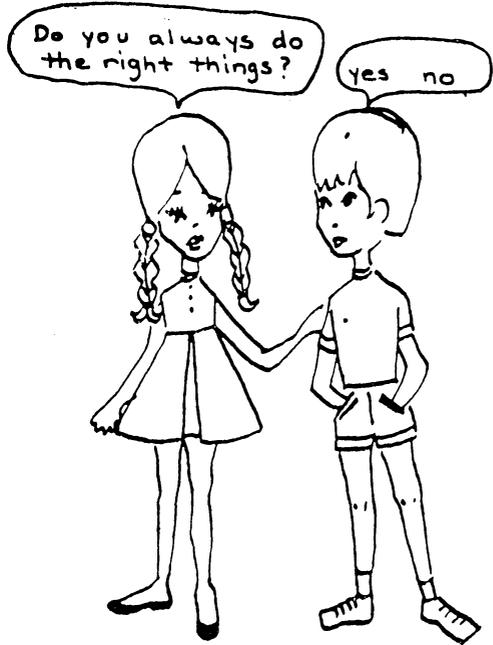
Parent's signature _____

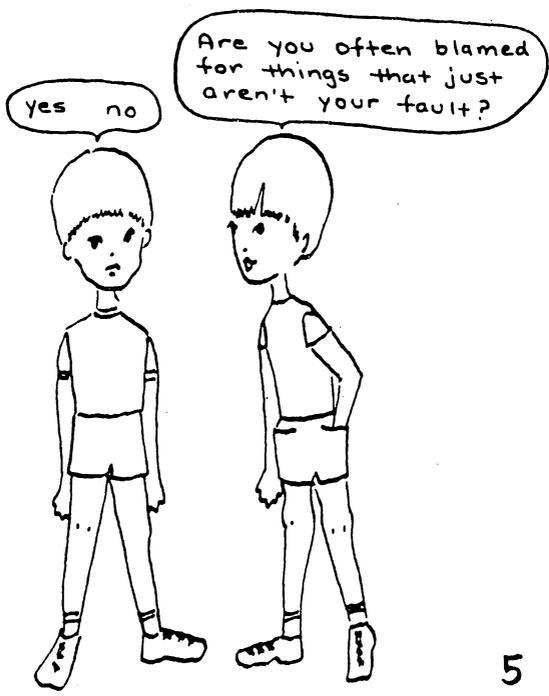
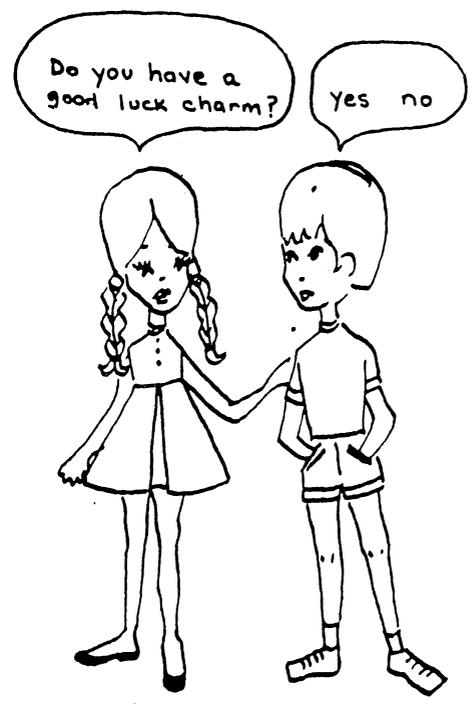
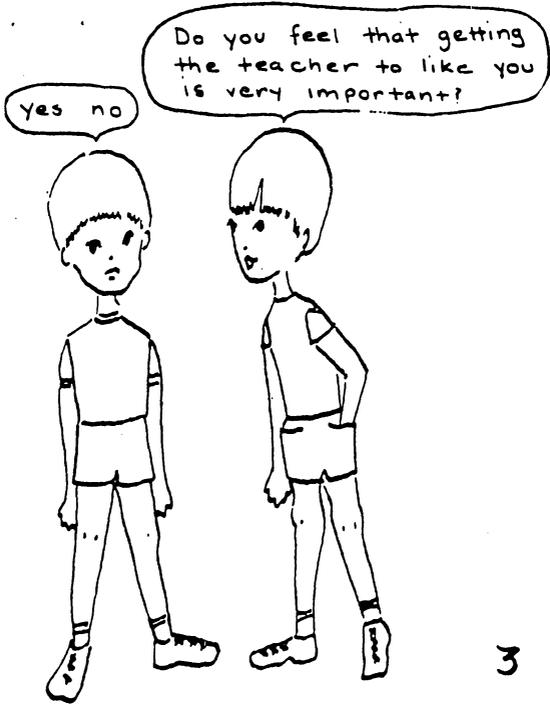
APPENDIX B
Locus of Control Scale

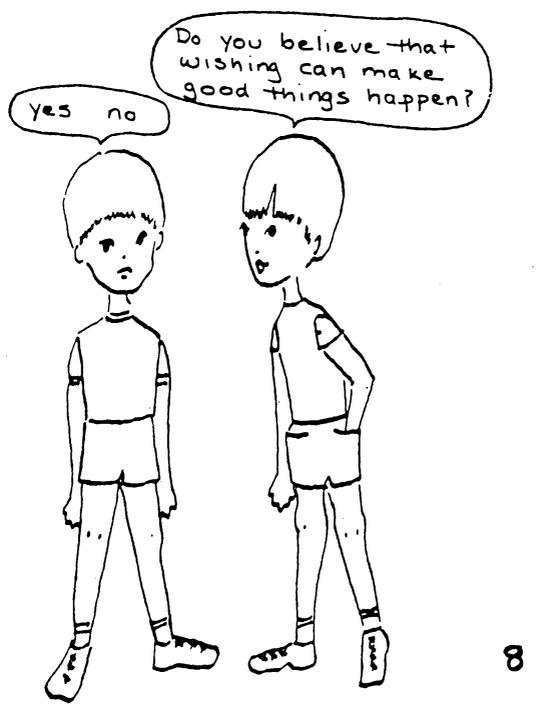
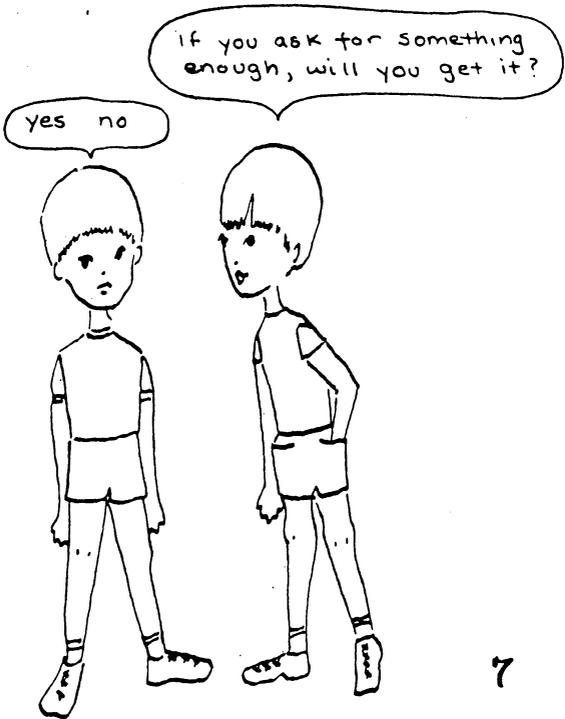
PPNSIE for boys

© S. Nowicki / M. Duke 1973

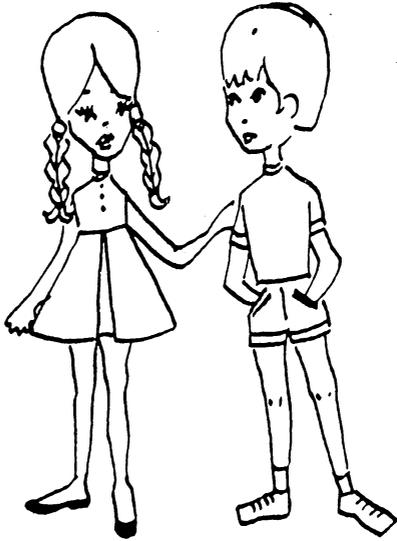
Example





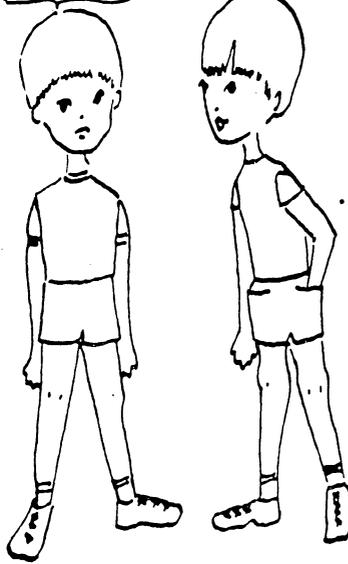


Do you have a lucky number?
yes no



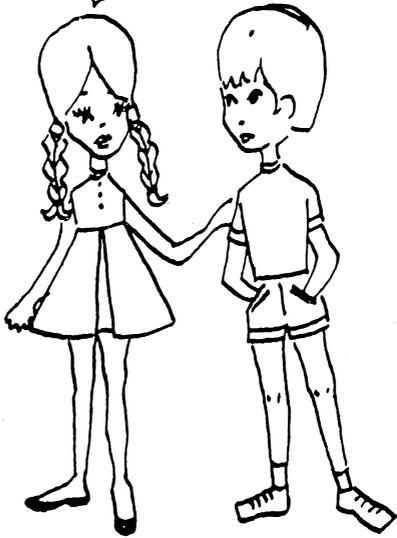
11

Can you get your Mommy and Daddy to do what you want to do instead of what they want to do?
yes no



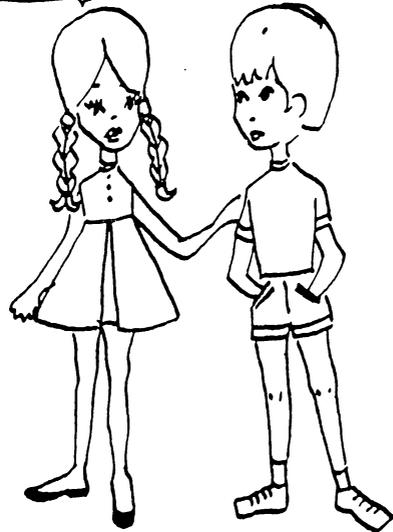
12

Does whether or not Mommy and Daddy like you depend on how you act?
yes no

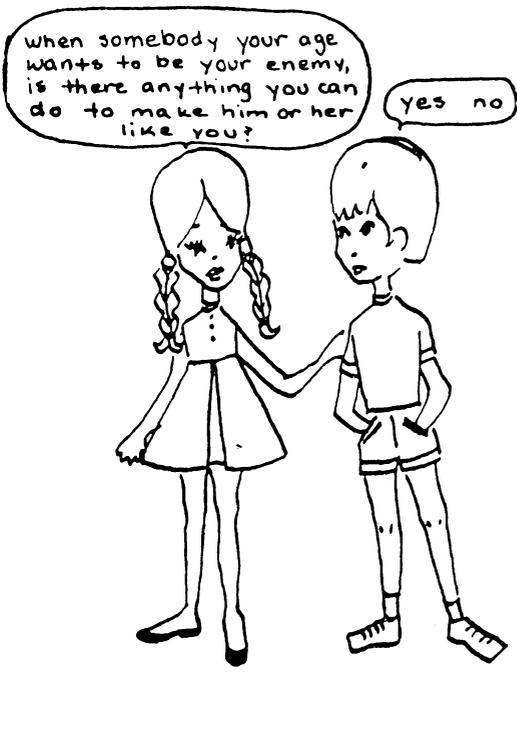
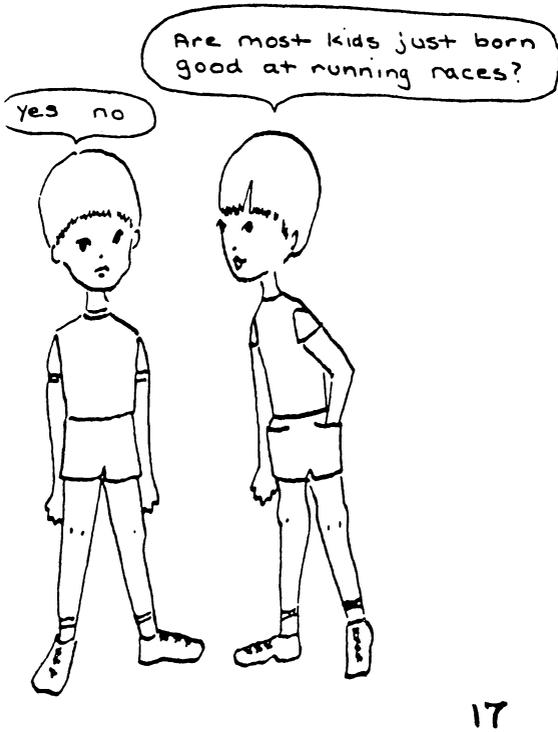
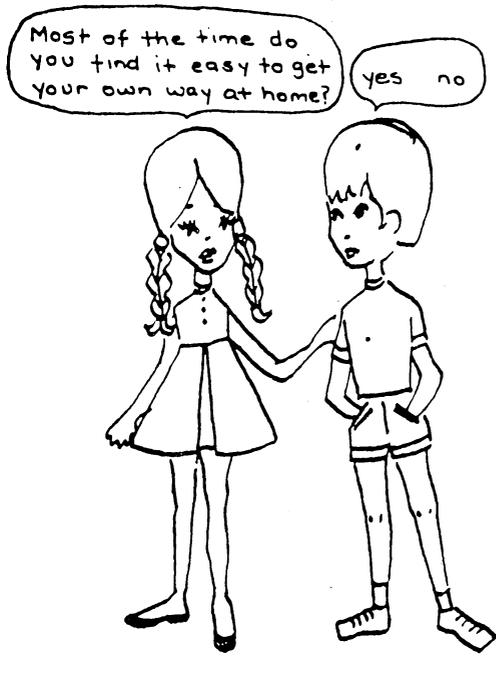


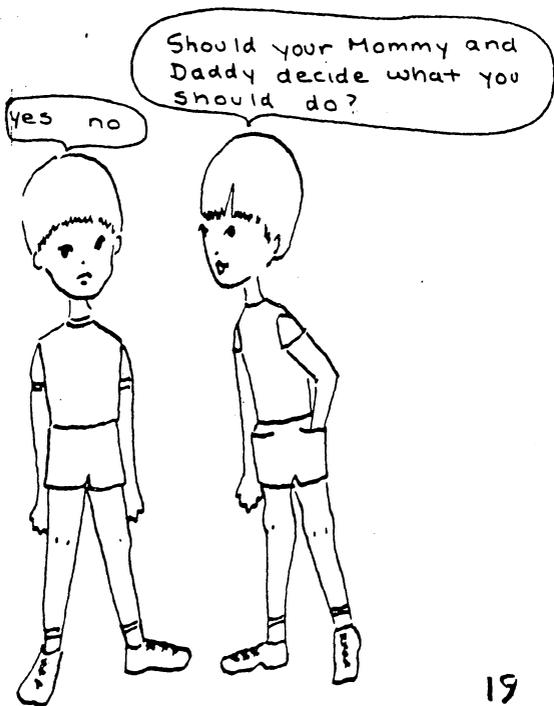
13

When people were mean to you, was it usually for no reason at all?
yes no

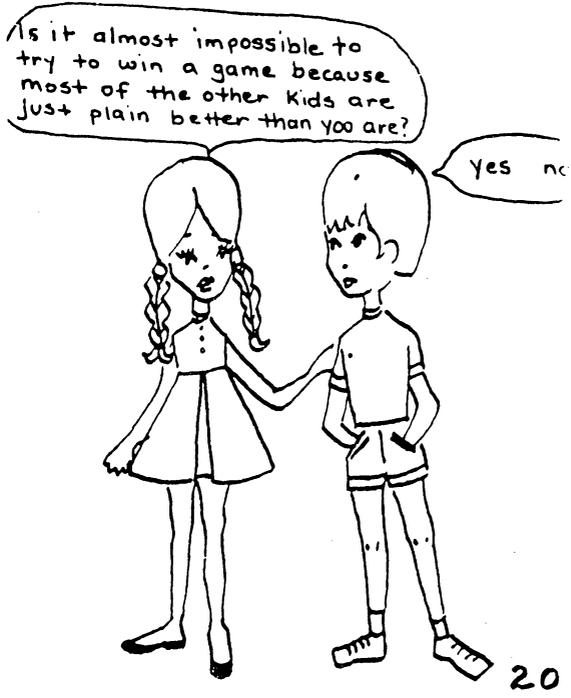


14

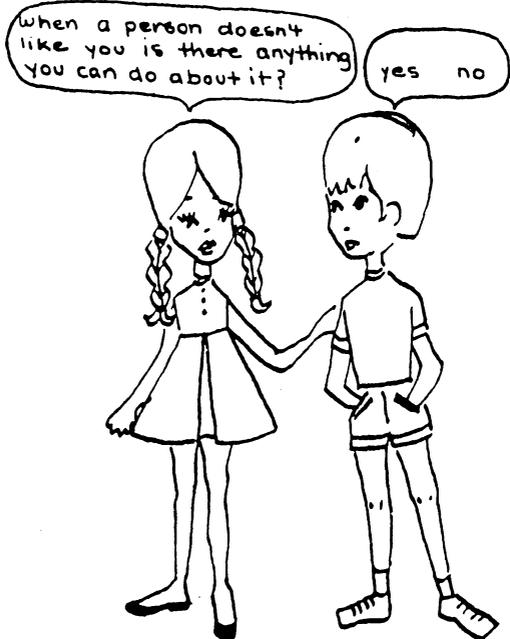




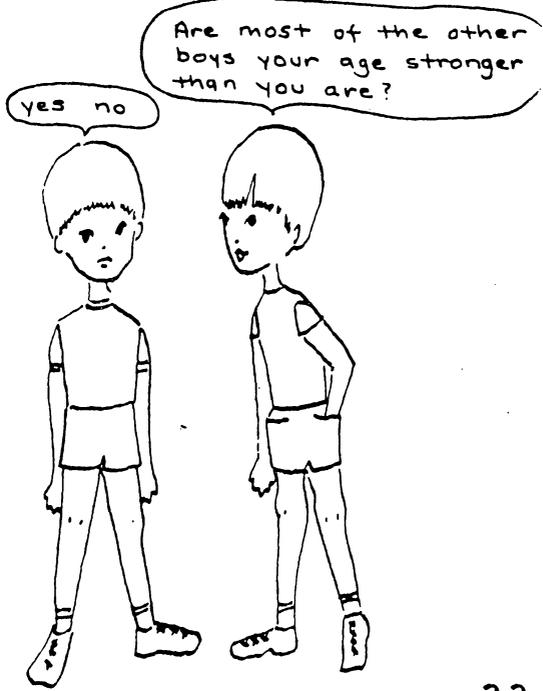
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20



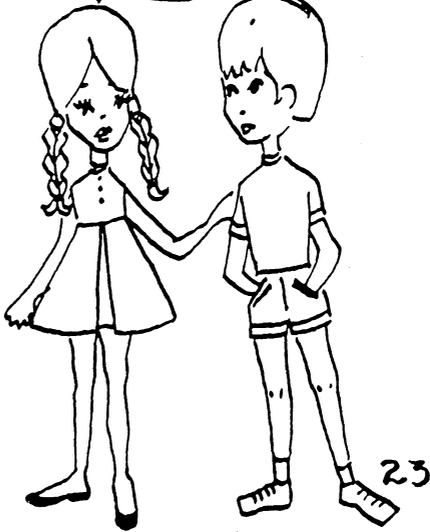
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22

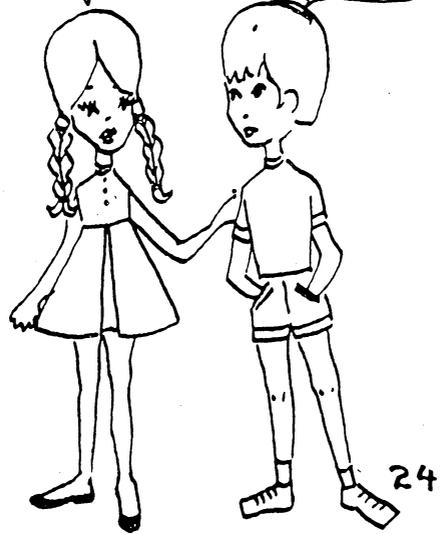
Are you the kind of child who believes that thinking about what you are going to do makes things turn out better?

yes no



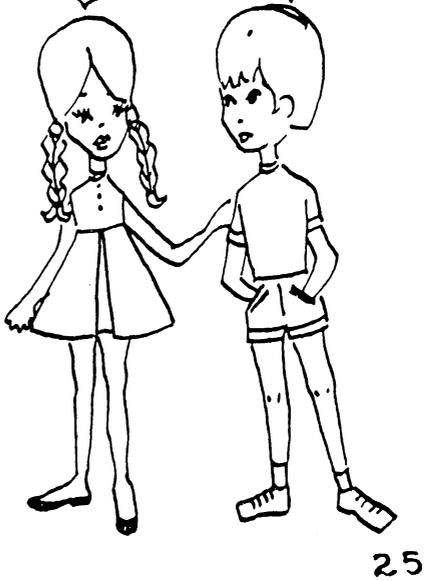
Do you think it's better to be smart than to be lucky?

yes no



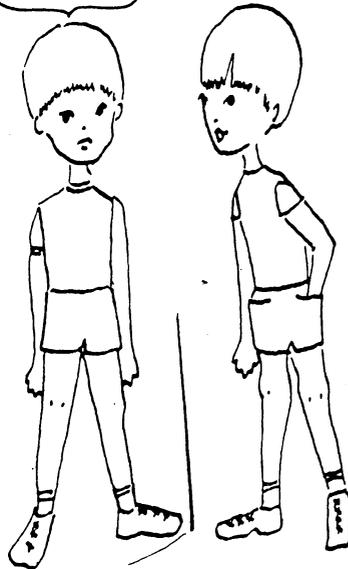
When another child hits you, is it usually because of something you did?

yes no



Is one of the best ways to handle a problem just not to think about it?

yes no



Preschool and Primary Form
of the
NOWICKI-STRICKLAND
LOCUS OF CONTROL SCALE FOR CHILDREN
SCORING KEY

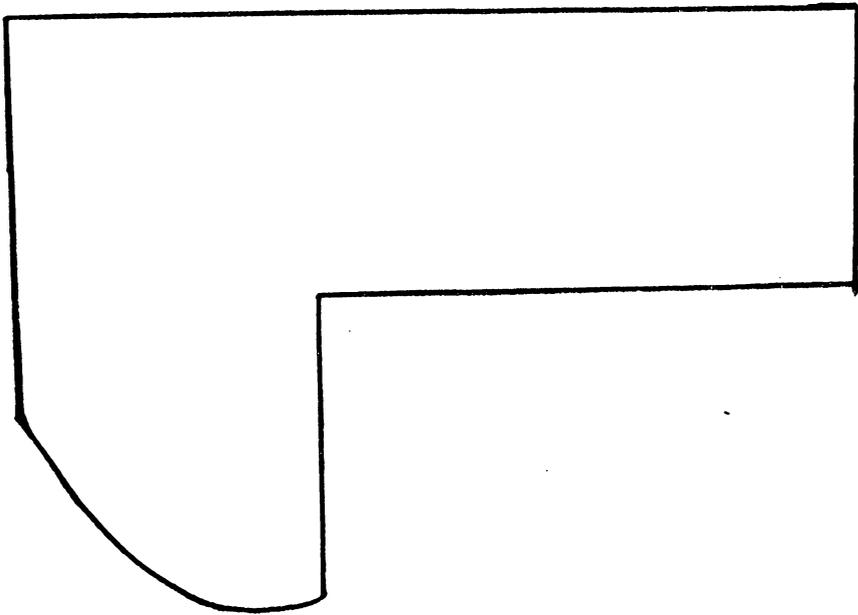
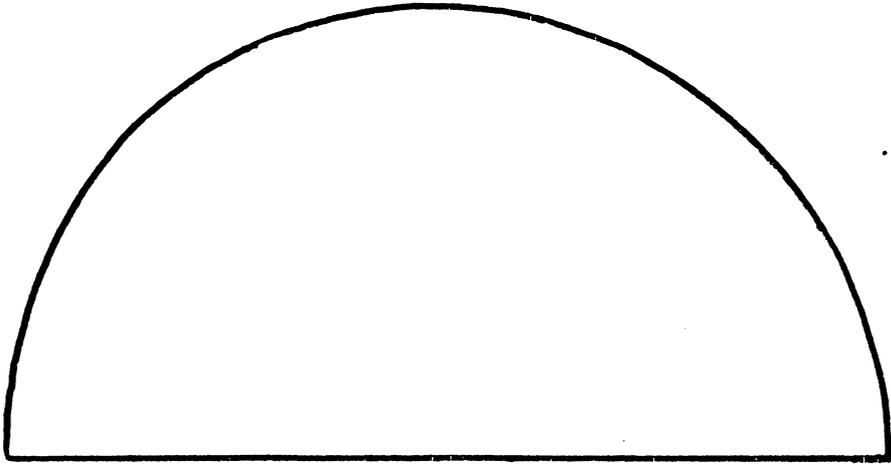
LOC - Keyed for externality :

4, 5, 6, 8, 11, 14, 15, 17
19, 20, 22, 26

1, 2, 3, 7, 9, 10, 12,
13, 16, 18, 21, 23, 24,
25.

APPENDIX C

Three-Dimensional Pattern Meanings



APPENDIX D
Ideational Fluency Score Sheets

"FCD: Child Development Area"

1/84

VPI & SU: Creativity Research

Answer Form

Subject Number: _____

What can you use a BOX for?

Child's Response: _____

FCD: Child Development Area

1/84

VPI & SU: Creativity Research

Answer Form

Subject Number _____

What can you use PAPER for?

Child's Response

Form 1
1/84

FCD: Child Development Area
VPI & SU: Creativity Research

Answer Form

Subject number _____ Time of Task _____

Name all the things you think this could be: 

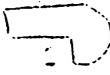
Child's Response

--	--

FCD- Child Development Area
VPI & SU: Creativity Research

Answer Form

Subject number _____ Time of Task _____

Name all the things you think this could be: 

Child's Response

APPENDIX E
Follow-up Letters



COLLEGE OF HUMAN RESOURCES

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061 - 8299

DEPARTMENT OF FAMILY AND CHILD DEVELOPMENT

Dear Parent:

Thank you for letting your child participate in my study on young children's creativity. The crayons or bubbles your child is bringing home were given for participation in the study. As soon as the results are analyzed I will be glad to share them with you. Thank you again for your help.

Melissa M. Groves

COLLEGE OF HUMAN RESOURCES



VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

Blacksburg, Virginia 24061 - 8299

DEPARTMENT OF FAMILY AND CHILD DEVELOPMENT

Dear Parent:

Although your child did not participate in my study on young children's creativity he/she was still given the opportunity to choose a prize of either bubbles or crayons. This was done in an effort to alleviate any conflict between children in your child's classroom.

Melissa M. Groves

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the scanned document**

REWARDS, LOCUS OF CONTROL AND IDEATIONAL FLUENCY IN
PRESCHOOL CHILDREN

by

Melissa M. Groves

(ABSTRACT)

The purpose of this study was to examine the relationship between rewards, locus of control and ideational fluency. Forty-three preschool children were initially administered the Revised Peabody Picture Vocabulary Test and the Preschool and Primary Nowicki-Strickland Internal-External Scale. Based on a median split of the locus of control measure, the children were assigned to either a reward or non-reward condition for the second session. In session two the children were administered two ideational fluency tasks, unusual uses and pattern meanings, under the assigned condition. Four separate 2 (external, internal) x 2 (reward, non-reward) analysis of variance were conducted for four ideational fluency scores (popular, original, total fluency and flexibility scores). No significant effects were found in any of the analyses. However, mean differences suggest that rewards limit ideational fluency while internal locus of control was related to originality.