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ABSTRACT

The generalization of "trained" creativity in easel painting to untrained creativity in blockbuilding was examined in two preschool boys. Verbal reinforcement of every different form painted in a picture increased both the number of different forms per picture and new forms (those appearing for the first time in the total output of paintings). The children's concurrent behavior in blockbuilding without differential reinforcement was also measured. There was generalization of form diversity from easel painting to blockbuilding in each condition of the study, but no generalization in the appearance of new forms. (Author/SET)

The Generalization of Creativity "Training" in Easel Painting to Blockbuilding

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The generalization of "trained" creativity in easel painting to untrained creativity in blockbuilding was examined in two preschool boys. Verbal reinforcement of every different form painted in a picture increased both the number of different forms per picture and new forms (those appearing for the first time in the total output of paintings). The children's concurrent behavior in blockbuilding without differential reinforcement was also measured. There was generalization of form diversity from easel painting to blockbuilding in each condition of the study, but no generalization in the appearance of new forms.

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A major problem in creativity training is that it requires teaching an abstraction rather than a specific set of behaviors that can be exhaustedly listed. If, for example, the abstraction of novelty is considered the criterion of creativity and is to be reinforced, then any specific response is novel only once. In other words, what is novel the first time is no longer novel thereafter. Thus, a non specific transfer must occur. The subject must discriminate the novelty of the response from the response itself. The novelty of the response is the fact that it can be discriminated as different from other responses (and is so discriminated by the person who has decided to reinforce novel behavior). Thus, to continue being reinforced, the subject must then emit steadily different responses to the same general stimulus situation, and the more responses already emitted, the more difficult this must become. Consequently, creativity training is demanding for the adult programming the reinforcement, as well as for the young child.

Two previous studies have experimentally analyzed creative block-building (Goetz and Baer, 1972) and creative easel painting (Goetz and Salmonson, 1972), using individual analysis designs. Block constructions and paintings were analyzed in terms of the number of different forms exhibited in each. One code defining 20 block forms and another defining 25 painting forms were used for these analyses. The independent variable in each case was the experimenter's descriptive verbal reinforcement, and the dependent variable was the number of forms (either built in one study, or painted in the other). In both studies, reinforcement was contingent on every different form made in the current construction or painting. This reinforcement increased not only form diversity but also new forms. The "form diversity" score of a product was simply the sum

total of the number of different forms it contained. The "new form" score was the number of forms in a single product that had never appeared previously in the child's total output of constructions or paintings within the study.

The present experimental analysis study defined creative behavior as new or novel behavior in a given situation. One situation was easel painting and the other blockbuilding. Objective forms made at the easel or with the blocks were defined, as in the other studies mentioned, and any new form not made previously was defined as creative. Again, forms new to the session in which they appeared were counted as a "form diversity" measure; forms new to all prior sessions in which the subject had participated were counted as a "new forms" measure. The question asked in the experimental design was, "Will the reinforcement of new responses per session in one hierarchy (easel painting) affect the occurrence of new responses in another hierarchy (blockbuilding)?" Reinforcement control of creative behavior in easel painting was demonstrated, using a reversal design for two subjects. At the same time, without reinforcement, the two subjects' creative behavior in blockbuilding was observed.

Subjects

Two boys from the Edna A. Hill Preschool Laboratories were selected as subjects for the present study because they consistently used few forms in both their painting and blockbuilding. One of the subjects, Les, was a five-year-old black boy of a low income family. He was being raised by his grandparents who had asked the teachers for assistance in coping with Les's aggressive behavior. The other subject, Rick, was a three-year-old white boy of a professional family who gave considerable time and attention to his academic upbringing.

Procedure

Each subject was invited by the experimenter to paint at a preschool easel, equipped with three color cups and three brushes, and located in a research room. The child himself determined the length of the sessions by stopping, usually with a verbal statement of completion, or by removing his painting smock. At this time the experimenter thanked the child and gave him a token and/or a toy of his choice.

Les's usual form diversity in easel painting was determined over three sessions during which he received no reinforcement while painting. In the following six sessions the experimenter delivered descriptive reinforcement (a combination of praise and a simple definition of the form) contingent on each different form painted in a single picture. Then for five sessions there was a return to the no reinforcement condition before reinforcement was again resumed in the final eight sessions.

Rick painted for five sessions without reinforcement to assess his baseline rate of form diversity per picture. During the next eight sessions Rick was reinforced for each different form he painted (in a single picture) by the experimenter describing the characteristics of such forms and praising his performance. There was a return to baseline conditions for the next three sessions. Then reinforcement procedures were resumed for the last six sessions.

A multiple baseline design was used across subjects. Within each subject a reversal design was used with the control of a return to baseline procedures.

In the blockbuilding sessions, which occurred over the same period of time as the easel painting sessions, a similar procedure was used to begin and end the research periods. The subject was required to use the same

selection of 53 blocks each time. However, reinforcement was never delivered in the blockbuilding sessions; a baseline condition of no reinforcement was maintained.

Reliability between the experimenter and an independent observer was taken on form diversity, new forms and time in all conditions for each subject in both easel painting and blockbuilding. Reliability was in the high nineties for all categories.

Results

Figure 1 shows that for both Les and Rick the use of descriptive reinforcement for each novel form per day in easel painting was effective in increasing the form diversity of successive paintings. When reinforcement was discontinued, form diversity decreased for each child, and again increased when reinforcement was resumed.

Insert Figure 1 About Here

Form diversity in blockbuilding was never reinforced. However, it also increased for Les and Rick during the days that form diversity in easel painting was reinforced. (Although Les's last two blockbuilding sessions show a low rate of form diversity, the mean for block form diversity in the last reinforcement condition, 6.6, was higher than the mean, 5.4, in the preceding reversal condition.) There was generalization of form diversity from art to blocks in each condition of the study for both Les and Rick.

Not only was form diversity of easel painting under reinforcement control, but the rate of new painting forms appearing for the first time was maximal during reinforcement conditions, as shown in Fig. 2. For

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Insert Figure 2 About Here

Les, .85 new painting forms appeared per reinforcement session, whereas .42 new forms appeared per nonreinforcement session. For Rick, .63 new painting forms appeared per reinforcement session, whereas .29 new forms appeared per nonreinforcement session. However, no generalization appeared between the rate of new forms emerging in painting and the rate of new forms emerging in blocks.

Discussion

Anyone interested in creativity training should ask the question, "Will the reinforcement of uncommon responses in one hierarchy of responses effect the occurrence of uncommon responses in another hierarchy?" The answer to this question would be valuable to the perennial busy teacher who needs to know whether or not to spend the time to train creativity in each specific area.

For both Les and Rick the use of descriptive reinforcement for new forms per daily picture was effective in increasing form diversity and the emergence of new forms. When reinforcement was discontinued, both form diversity and the rate of new forms decreased for each child, and again increased when reinforcement was resumed. Form diversity in blockbuilding also increased for both children, during the days when form diversity in easel painting was reinforced, although there was no differential reinforcement during the blockbuilding sessions. Thus, there was generalization for both subjects. However, there was no generalization from the rate of new forms in easel painting to those in blockbuilding.

The lack of generalization of new forms does not necessarily indicate that creativity did not generalize from the art activity to the blockbuilding for these two subjects. The make-up of each form diversity score is a creative elaboration in itself. That is to say, each set of different combinations of forms is a new composite form. A composite form of six

single forms would obviously be a different composite form than one of seven single forms. A computer tally of all various combinations of forms could specifically identify each new elaboration, but the form diversity score itself is a rough measure of creative elaborations. Consequently, if the number of different forms increases, the number of creative elaborations increases along with it. Since there was generalization of increase and decrease in form diversity, which represents creative elaborations, one can state that there was, to that extent, a generalization of creativity from art to blocks. It is supportive to note that Torrance (1966) in the Minnesota Tests of Creative Thinking scored elaboration in drawing as creative behavior.

It appears that creative behavior can involve a general concept that can be applied to specific tasks such as easel painting and block-building. Some theorists will see a significant role for self-reinforcement in this generalization of creativity. However, the training program necessary for total generalization has yet to be developed. But, at any rate, perhaps the busy teacher may find some relief in knowing that once she "trains" creative behavior in one specific area, the general concept of creativity may be applied to other areas by the child himself without her help or at least with less help.

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Figure 1

Fig 1. The form diversity exhibited in each painting and block session for both Les and Rick under nonreinforcement and reinforcement conditions.

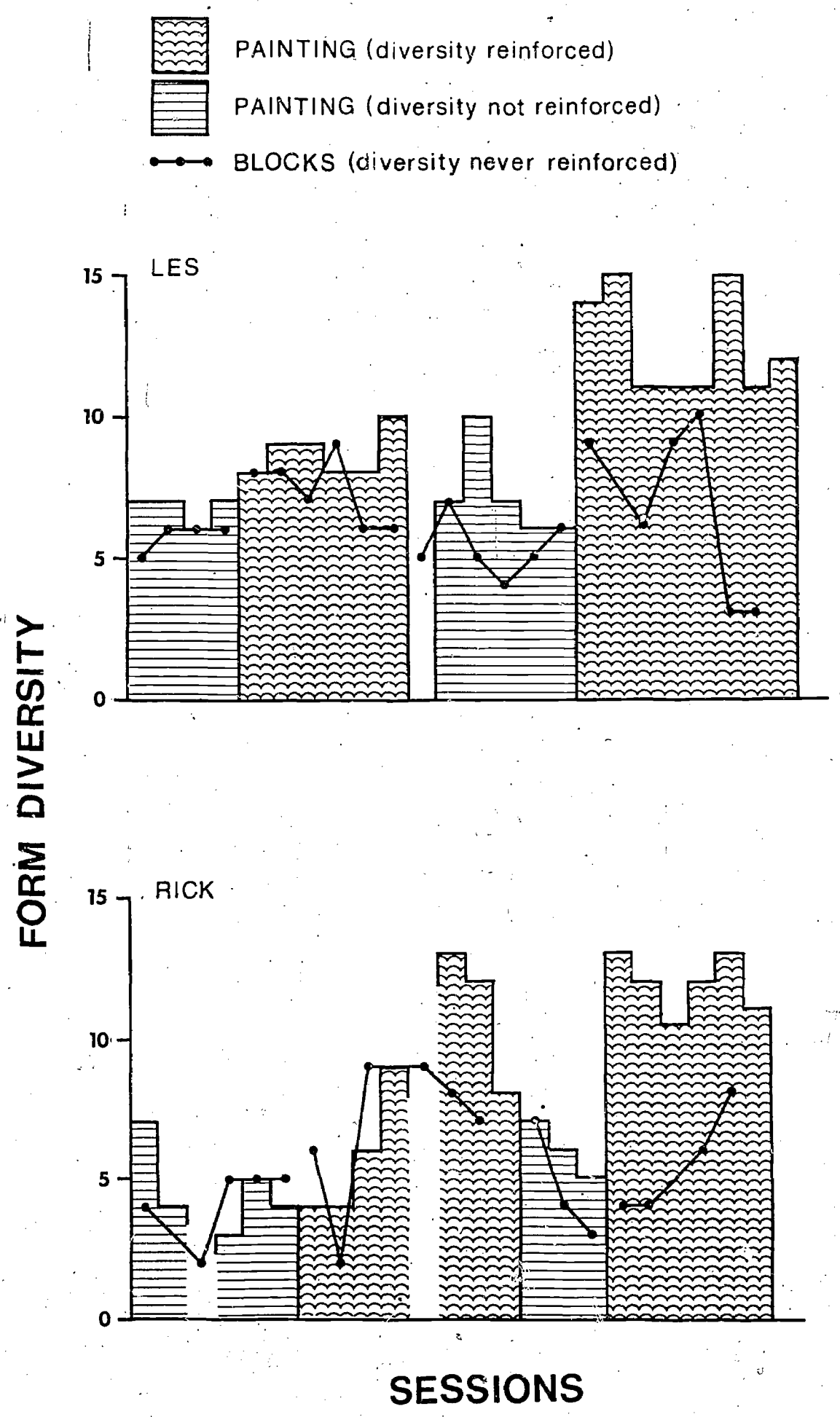
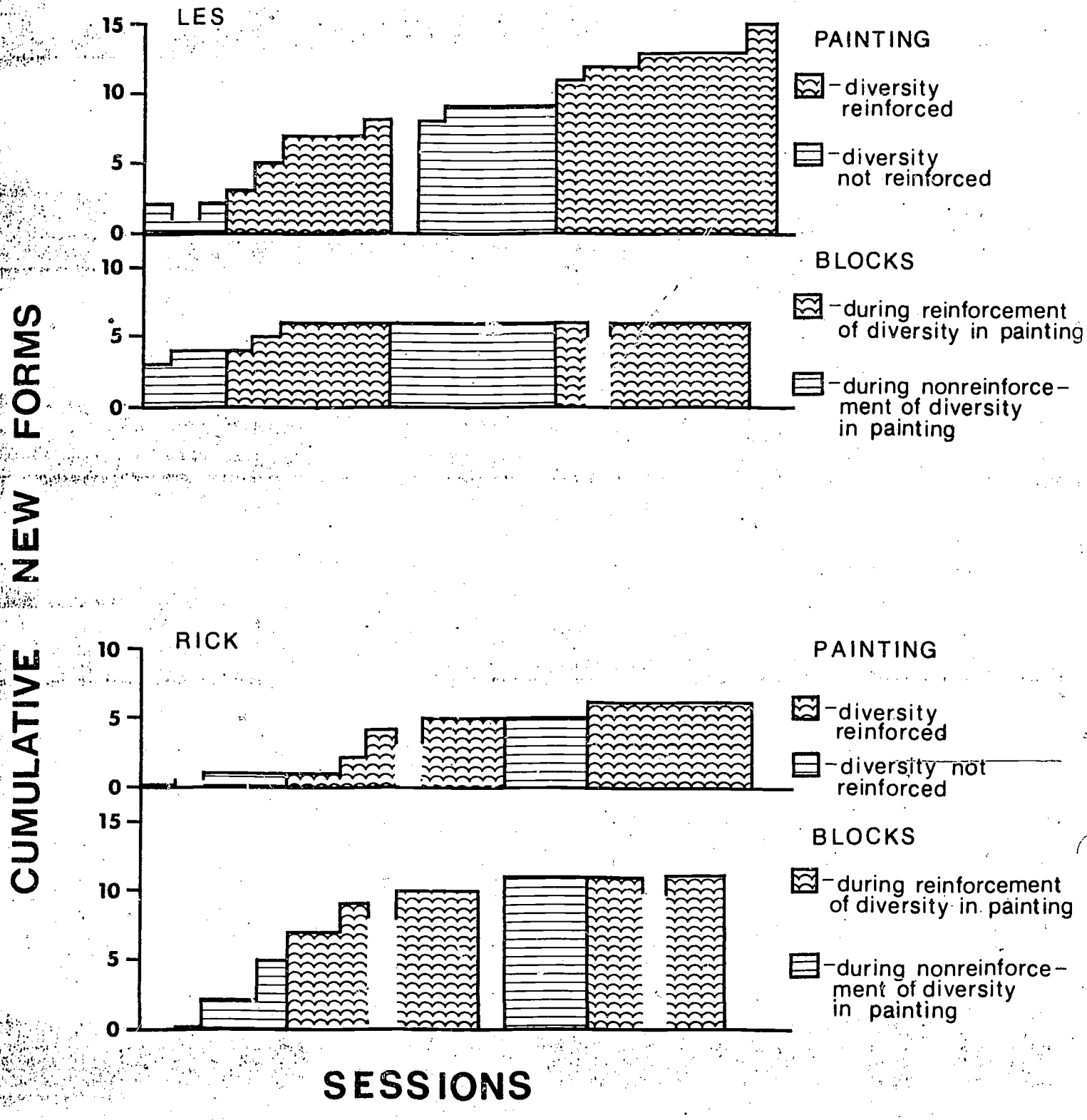

PAINTING (diversity reinforced)
PAINTING (diversity not reinforced)
BLOCKS (diversity never reinforced)
LES
RICK
15
10
5
0
FORM DIVERSITY
SESSIONS

Figure 2

Fig 2. Cumulative new forms as they appeared in each session of painting and blockbuilding for Rick and Les under nonreinforcement and reinforcement conditions.


LES
15
10
5
0
PAINTING
-diversity reinforced
-diversity not reinforced
10
5
0
BLOCKS
-during reinforcement of diversity in painting
-during nonreinforcement of diversity in painting
CUMULATIVE NEW FORMS
RICK
10
5
0
PAINTING
-diversity reinforced
-diversity not reinforced
15
10
5
0
BLOCKS
-during reinforcement of diversity in painting
-during nonreinforcement of diversity in painting
SESSIONS