DOCUMENT RESUME

ED 136 785 IR 004 574

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TITLE Media and Creativity: Effects of Pictures on Ideational Fluency in Children.
PUB DATE Apr 76
NOTE 9p.; Paper presented at the Annual Meeting of American Educational Research Association (New York City, April 4-8, 1977)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Analysis of Variance; *Concept Formation; *Creativity; Creativity Research; Creativity Tests; Grade 4; Grade 7; Grade 9; Imagery; Imagination; *Pictorial Stimuli; Visual Perception

ABSTRACT

The effects of slide photos on ideational fluency in 240 children in grades IV, VII and IX were studied. Children listed uses of tires and knives and similarities between potatoes and carrots, and cats and mice. It was reasoned that stimula which attract attention too closely to physical characteristics of objects directly under consideration should impede productivity of answers. The results strongly substantiated this prediction for grade IX but not for grades IV and VII. Presenting slides of "remote" objects (those not directly under consideration) was suggested as a more creative use of media for older children. (Author)

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American Educational Research
Association Annual Meeting,
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(a) Objective

To test the effects of viewing slide photos on ideational fluency of children in grades IV, VII and IX.

(b) Theoretical framework

Wallach (1970) has presented a cogent argument that creativity involves ideational fluency: the process of generating associations without regard to evaluating them. In addition Piavio (1971) has collected arguments strongly suggesting that imagery plays an important role in creativity. In relating these findings to the classroom use of media, the obvious prediction seems to be that media should enhance creativity. Nevertheless, there is at least one circumstance in which a reasonable argument could be made for the opposite effect. Creativity involves remote associations. Environmental stimuli that attract attention too closely to the physical characteristics of objects, therefore, should impede the creative use of them. If this argument were upheld by empirical evidence, it would provide an important caution in the use of media and stimulate more creativity in their use.

The distinction between remote and close associations should be clarified. Brooks (1967, 1968) showed that visual imagery and visual perception are opponent processes that cannot be done simultaneously. If subjects must do both in order to accomplish a task, they engage in a time-sharing activity in which they alternate between one process and the other. Presenting a picture of one object, therefore, should interfere with imagining other objects. This has important consequences for performance on traditional creativity questionnaires. Similarities are major aspects of such questionnaires either explicitly in items calling for them or implicitly in items such as those calling for alternative uses of objects. A similarity between two objects distinguishes them from a third, which will be referred to as the "remote object." To say "A cat and mouse are." does not distinguish them from any remote objects and is not generally accepted as a similarity. Since perception interferes with imagination, presenting a picture of a cat and a mouse may interfere with imagining a remote object and, therefore, with identifying a similarity.

In order to test this idea, four items were selected from Wallach and Kogan's (1965) creativity questionnaire and presented either with or without corresponding color slide photographs of the objects named in the items. Because major developmental differences in identifying similarities have been noted (Bruner and Olver, 1963), three age groups were used (grades IV, VII, and IX). Finally, Wallach and Kogan (1963) found productivity and uniqueness to correlate moderately well. However, there are considerable semantic difficulties with objectively evaluating uniqueness (See Dirlam, 1975; Dirlam, Courtney, Uttich and Hays, 1974). Therefore, responses to these items were scored only for productivity.

(c) Methods

There were 240 subjects (20 boys and 20 girls in each of the six treatment X age groups). All subjects were selected from four suburban Montreal schools in the same, predominantly middle-class, school district. The subjects were assigned at random to the media or non-media groups. According to school records all subjects had IQ's of 90 or above and had acceptable performance on hearing and vision screening tests.

The test was administered to groups of 15 - 26 children. Both the media and non-media groups received similar instruction except that the media group received additional instructions to look at the picture to help them generate answers. The picture remained in full view for the total time of presentation for each item.

(d) Data source

The four items from Wallach and Kogan's test for ideational fluency called for written responses of the following types: (1) alternate uses of a table knife, (2) alternate uses of a car tire; (3) similarities between a potato and a carrot, and (4) similarities between a cat and a mouse. A form for the responses for each type of item was provided. Although the children were not told of a time limit, the forms were collected after 7 minutes. Informal observations suggested that any longer time would have created difficulties for the youngest children but would have been preferred by the oldest ones.

(e) Results

After homogeneity of variance was established by the use of Cochran's test, the data were analyzed by the use of a four factor analysis of variance (treatment X grade X sex X item: see Kirk, 1968). There were three significant interactions, the means for which are presented in Tables 1, 2 and 3.

Insert Tables 1, 2 and 3 about here

The analysis of variance showed a highly significant treatment by age interaction" $F(2,228) = 8.06$, $p < .001$. Post facto comparisons revealed no effect of the media during grades IV and VII and an extremely significant negative effect by grade IX: $t(2,228) = 1.59$ (NS), -0.51 (NS), -4.03 ($p << .001$), respectively. In addition, there was a significant age by item interaction which was the result of less variation between test items for the fourth graders than for the seventh and ninth grade children: $F(6,684) - 22.44$, $p << .001$. Specifically, in the higher grades the number of uses of a tire was relatively depressed and the number of similarities between a cat and mouse was relatively enhanced compared to the other items. Finally, there was a significant age by item interaction, which was the result of the boys performing better than the girls for the "uses" items and the reverse for the "similarities" items: $F(3.684) = 7.35$, $p < .001$. No other interactions approached significance.

(f) Educational and scientific importance of the study

The major finding of the study concerns the poor performance of the oldest students tested with the media condition. For students with well developed abilities to discover similarities, pictures of the objects in question (at least when these are common objects) appear to be poor uses of media. This conclusion supports the major argument that creativity involves the visual imagination of remote objects. A more creative use of media, therefore, might be to show slides of a variety of remote objects and suggest to students that they think of differences between the objects in question, on the one hand, and the objects pictured, on the other. A direct test of this suggestion should provide useful information.

A secondary finding was that performance was relatively uniform with the young children, who had considerable difficulty with these tasks, while performance on the item referring to animate objects (cat and mouse) was much superior to performance on the other items for older children. This suggests that creativity emerges earlier in children's thought about animate objects than in their thought about inanimate objects.

The final finding was that boys were superior to girls on the uses of a knife and tire and the reverse was true for the similarities of potatoes and carrots, and cats and mice. This finding is confounded since the difference may be due to the experience of the sexes with the objects or to their abilities with the question types (uses vs. similarities).

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Table 1

Mean Number of Answers With and Without Media at Three Grade Levels

Grade Level	Treatment Groups	
	Media	Non-Media
Grade IV	11	9
Grade VII	17	18
Grade IX	21	25

Table 2

Mean Number of Answers per Item for Children at Three Grade Levels

Grade Level	Items			
	Knife Uses	Tire Uses	Potato-Carrot Similarities	Cat-Mouse Similarities
Grade IV	8	9	9	13
Grade VII	15	14	15	25
Grade IX	20	18	21	31

Table 3

Mean Number of Answers per Item
for Boys and Girls

Sex	Items			
	Knife Uses	Tire Uses	Potato-Carrot Similarities	Cat-Mouse Similarities
Boys	15	14	15	22
Girls	14	14	16	24