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ABSTRACT

Three randomly assigned groups of sixth grade students watched a videotaped white female model present sets of responses to a creativity test categorized as low flexibility, low originality; high flexibility, low originality; and high flexibility, high originality. A randomly assigned control group viewed the same videotaped model giving instructions but not creative responses. Subjects then responded to the Unusual Uses and Just Suppose tests from the Torrance Tests of Creative Thinking. Modeling did have an effect on children's creative performance, but direction and magnitude of the effect was dependent upon sex, race, creativity traits measured, and test used. (Author)

The Influence of Modeling on Children's Creative Performance

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Within the last two decades many critics, theorists, and practitioners have called for increased emphasis on the development of creative problem solving abilities and the establishment of an educational environment where such abilities will flourish. Warning that our culture will perish unless man can make new and original adaptations to the environment, Carl Rogers (1959) expressed concern that schools turn out conformists and sterotyped individuals rather than creative and original thinkers. Also concerned that schools have been preoccupied too long with order and control, Charles Silberman (1970) has said that the goal of education must be not only to prepare people to earn a living but also to live a life which is creative, humane, and sensitive. Likewise, Rollo May (1975), recognizing the perhaps dismal prospects for the future, has pointed out the need for the courage to create new forms, new symbols, and new patterns on which society can build.

Recently modeling, which is an aspect of social learning theory, has been considered one of the possible means of facilitating creative behavior. Research regarding the effects of modeling on creative performance is sparce, though. One exception is a study done by Zimmerman and Dialessi (1973) in which they investigated the influence of a videotaped male who modeled responses to a creativity test varying in fluency and flexibility for fifth and sixth grade students. They found that (1) model fluency was directly related to subjects' fluency and flexibility on a similar creativity test, (2) model flexibility was inversely related to subjects' fluency and flexibility on both a similar and dissimilar creativity, and (3) model flexibility had a significantly different effect for male and female subjects on both tests. The effect of model fluency on subject fluency was consistent with

social learning theory; however, the effect of model flexibility was contrary to social learning expectations. The fact that originality was not considered is a definite weakness of their study which could account for such conflicting results, especially when it is noted that in their high fluency-high flexibility treatment condition the modeled responses were lower in originality than were those in their high fluency-low flexibility treatment condition.

It seems obvious that much more research is needed before we know with any assurance whether or not modeling can be used to facilitate creative behavior, and, if so, what modeled behaviors are most facilitative for whom. The purpose of this study was to investigate the influence of a creative model on the creative performance of children. Specifically, the objective was to determine the effect of sets of modeled responses which varied in flexibility and originality on the creative performance of black and white boys and girls as measured by the Unusual Uses and Just Suppose tests from the Torrance Tests of Creative Thinking (1974).

METHOD

Subjects

The subjects for this study consisted of 237 sixth graders in a middle school in a southern university city who ranged in ages from 11 to 13 years. They were randomly assigned by race and sex to three treatment groups and a control group with each group having approximately equal numbers of black males, black females, white males, and white females. Mean IQ scores as measured by the California Test of Mental Maturity ranged from 101 to 103 across the four groups. Mentally retarded subjects were not included in this sample.

Procedure

A videotaped white female model presented one of three sets of 20 sample responses from the Unusual Uses Test for Cardboard Boxes, subtest five of verbal form A of the Torrance Tests of Creative Thinking (TTCT) (Torrance, 1974), to each of the three experimental groups. The three sets were: (1) low flexibility-low originality responses having a total flexibility score of 1 and originality score of 0 relative to TTCT scoring scheme, (2) high flexibility-low originality responses having a total flexibility score of 12 and originality score of 0 relative to the TTCT scoring scheme, and (3) high flexibility-high originality responses having a total flexibility score of 12 and originality score of 40 relative to the TTCT scoring scheme. She also gave instructions for the testing which was the final part of the experimental procedure. The control group viewed the same female model giving test instructions and directions but not creative sample responses.

Immediately after viewing the videotaped model, subjects in each group took the Unusual Uses for Tin Cans Test, subtest five of verbal form B of the Torrance tests, which was similar to the modeled test. They also took subtest seven of verbal form B of the Torrance tests, Just Suppose, which was dissimilar to the modeled test.

The entire experimental procedure took place in one morning between 9:00 and 11:00 a.m. For the treatment each of the four groups were randomly assigned to one of the four 30-minute experimental sessions. The experimenters served as monitors for each session.

Data reported in the norms-technical manual for the TTCT (Torrance, 1974), reviews such as those by Holland (1968), and numerous studies by others indicate useful reliability and validity for the Torrance tests. Interscorer reliability

for the professional scorers from the Georgia Studies of Creative Behavior who scored the tests on fluency, flexibility, and originality for this study was .90 or above.

ANALYSIS AND RESULTS

The composition of the treatments and subjects yielded a 4 x 2 x 2 factorial analysis of variance design. There were four levels of the modeling or treatment factor: (1) low flexibility-low originality, (2) high flexibility-low originality, (3) high flexibility-high originality, and (4) control viewing no modeled creative responses. The subjects were further classified according to race and sex factors with there being two levels for each of these two factors. Analyses of the effects of the four treatment levels, interaction of treatment by race, treatment by sex, and treatment by race by sex were computed with subjects' fluency, flexibility, and originality scores on both the similar Unusual Uses test and the dissimilar Just Suppose test as dependent variables. Duncan's multiple range test was utilized when F tests proved significant at the .05 level in order to identify the specific source of mean differences. The data were analyzed using the Statistical Analysis System (Barr & Goodnight, 1972), a comprehensive set of computerized statistical programs.

The means and standard deviations for fluency, flexibility, and originality on the Unusual Uses and the Just Suppose tests for the three treatment groups and the control group are reported in Table 1. As can easily be

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INSERT TABLE 1 ABOUT HERE

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discerned from Table 1 there is a significant main effect for treatment on fluency using the Unusual Uses test, $F(3,221) = 12.14$, $p < .05$. Duncan's multiple range test indicated that the low flexibility-low originality group ($\bar{X}=27.71$) scored higher than the high flexibility-low originality group ($\bar{X}=16.89$), the high flexibility-high originality group ($\bar{X}=19.20$), and the control group

($\bar{X}$=27.63). A significant treatment by race interaction [$F(3,221) = 2.64$, $p < .05$] also resulted for fluency on the Unusual Uses task. Here blacks in Group 1 ($\bar{X}$=26.21) scored significantly higher than blacks in the control group ($\bar{X}$=14.09) while whites in Group 2 and Group 3 ($\bar{X}$'s=18.38 and 20.46, respectively) were significantly lower than whites in the control group ($\bar{X}$=26.00). Treatment by sex and treatment by race by sex on fluency for the Unusual Uses task yielded F's < 1.00.

Readily apparent in Table 1 also is the significant treatment effect for flexibility scores on the Unusual Uses tests, $F(3,221 = 11.94$, $p < .001$. Again the low flexibility-low originality group ($\bar{X}$=6.64) was the significantly different group as shown by Duncan's multiple range test but this time the mean was significantly lower than the mean for the high flexibility-low originality group ($\bar{X}$=9.65), the high flexibility-high originality group ($\bar{X}$=10.18), and the control group ($\bar{X}$=9.23). The treatment by race by sex interaction for flexibility on the Unusual Uses test was significant, $F(3,221) = 3.12$, $p < .05$. Altogether, out of 120 interaction comparisons, 51 significant mean differences occurred which are difficult to interpret. However, some trends did appear that highlight race-sex-treatment interactive effects. For example, black females and white males reacted similarly to treatments. Means for black females ($\bar{X}$=4.00) and white males ($\bar{X}$=7.47) in Group 1 were respectively lower than means for black females ($\bar{X}$=8.50) and white males ($\bar{X}$=11.00) in the control group. White females responded differently in that there were no significant differences between means in the four treatment conditions. On the other hand, black males in Group 3 ($\bar{X}$=8.00) scored significantly higher than black males in Group 1 ($\bar{X}$=4.67) and black males in the control group ($\bar{X}$=3.50).

Referring back to Table 1, it is further obvious that the treatment effect for originality for the Unusual Uses test was significant, $F(3,221) = 8.39$, $p < .001$. Here the mean for the control group ($\bar{X}$=24.33) was significantly higher

than means for experimental Group 1 ($\bar{X}$=12.68), Group 2 ($\bar{X}$=13.84), and Group 3 ($\bar{X}$=17.20) as revealed by Duncan's test. The treatment by race interaction was significant for originality on the Unusual Uses test, $F(3,221) = 7.58$, $p < .001$. Means for whites in Group 1 ($\bar{X}$=16.94), Group 2 ($\bar{X}$=14.62), and Group 3 ($\bar{X}$=18.10) were significantly lower than the control group mean for whites ($\bar{X}$=33.11) while there were no significant differences between black subjects in the four treatment conditions.

Only a cursory observation of Table 1 is needed to see that the modeling effects were much less significant for the Just Suppose test as compared to the Unusual Uses test, especially on the fluency and flexibility measures. On the Just Suppose test the main effects for treatment, treatment by race interaction, treatment by sex interaction, and treatment by race by sex interaction were all insignificant for fluency and flexibility. The treatment effect on originality for the Just Suppose test was significant, $F(3,221) = 3.30$, $p < .05$. Here the mean for the control group ($\bar{X}$=8.28) was the highest of the four treatment levels and significantly higher than the mean for Group 3 ($\bar{X}$=5.21).

DISCUSSION

The evidence subsequently presented for the Unusual Uses test failed to resolve the anomaly that model fluency increased subject fluency and model flexibility decreased subject flexibility as implied by Zimmerman and Dialessi. With regard to fluency in the present study, differences were found between experimental and control groups and subgroups although model fluency was held constant. An hypothesis which might help to explain these results could be that the experimental modeling conditions served as a low fluency model for the white subjects and a high fluency model for the black subjects.

With regard to subject flexibility on the Unusual Uses test, model flexibility was not generally inversely related to subject flexibility. Black females and white males in the high flexibility-high originality group and the control group responded with significantly higher flexibility than those in the low flexibility-low originality group. The high flexibility-low originality model also influenced black females and white males to produce more flexible responses than black females and white males exposed to the low flexibility-low originality model. The failure of the white females to respond differently on flexibility across all treatments is an added indication that discussion of model effect on flexibility would need to be supported by a statement of subject race and sex.

On both the Unusual Uses and the Just Suppose test one consistent finding emerged: whites in the control group scored significantly higher than those in the experimental groups. For some reason the modeling of both low originality and high originality seemed to suppress original responses by the white subjects. This finding definitely warrants further study.

On the dissimilar Just Suppose test no significant differences were found among the groups on subject fluency and flexibility. Such results might have been expected for fluency since this variable was held constant. However, flexibility, which was varied, might have been expected to have had differential effects. Lack of differential results here suggests caution before generalizing modeling effects to dissimilar situations.

Relating results of this study to social learning theory, we find predictable the outcome that subjects who observed the low flexible-low original model responded with lower flexibility scores than the subjects who observed the high flexible-low original model, the high flexible-high original model, and

the control model. However, results revealing that subjects who observed a highly original model gave fewer original responses on both the similar and dissimilar tasks than subjects in the control group is most inconsistent with social learning theory.

Truely, the relationship between modeling and creativity is a complex one which can be fathomed only with extensive study. Such is recommended.

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TABLE 1

MEANS AND STANDARD DEVIATIONS ON FLUENCY, FLEXIBILITY, AND ORIGINALITY FOR THE UNUSUAL USES AND JUST SUPPOSE TESTS FOR THE FOUR LEVELS OF TREATMENT

Trait	Control (N=60)		Group 1 (N=59)		Group 2 (N=57)		Group 3 (N=61)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
				Unusual Uses Test				
Fluency	21.63	14.16	27.71	12.05	16.89	7.74	19.20	9.42
Flexibility	9.23	4.08	6.64	4.28	9.65	3.68	10.18	3.80
Originality	24.33	23.61	12.68	14.22	13.84	8.65	17.20	9.98
				Just Suppose Test				
Fluency	7.30	4.52	7.24	4.81	7.63	5.44	6.85	4.15
Flexibility	2.20	2.31	1.88	1.63	2.58	3.62	2.57	2.38
Originality	8.28	7.57	6.10	4.54	5.51	8.57	5.21	4.00

Note.--Group 1 = low flexibility-low originality

Group 2 = high flexibility-low originality

Group 3 = high flexibility-high originality