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ABSTRACT

The effects of task complexity and vicarious reward upon children's ability to learn a substantial educational task through modeling were investigated. After observing a models performance, all subjects (elementary school students) were offered direct reward for matching responses. Accuracy of imitative learning was inversely related to task complexity and facilitated by the presence of vicarious reward. However, as predicted, vicarious reward had a significant effect only for subjects in the high complexity condition, and had negligible effects for subjects exposed to the low complexity task. These results are consistent with the hypothesis that vicarious and direct reward may operate additively, with the former serving primarily to enchance subjects attention to the relevant modeling cues. (Author)

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Summary

The effects of task complexity and vicarious reward upon children's ability to learn a substantive educational task through modeling were investigated. After observing a model's performance, all Ss were offered direct reward for matching responses. Accuracy of imitative learning was inversely related to task complexity and facilitated by the presence of vicarious reward. However, as predicted, vicarious reward had a significant effect only for Ss in the high complexity condition, tended to enhance the performance of Ss in the moderate complexity condition, and had negligible effects for Ss exposed to the low complexity task. These results are consistent with the hypothesis that vicarious and direct reward may operate additively, with the former serving primarily to enhance Ss' attention to the relevant modeling cues.

Vicarious Reward and Task Complexity as Determinants of Imitative Learning[1]

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Working within a social-learning framework, Liebert and Fernandez (in press) recently demonstrated that both vicarious and direct reward may increase young children's matching of the commodity preferences of an adult model and suggested that vicarious reward may serve initially to enhance the observers' attention to a model's behavior, as well as to provide them with information by which to guide their own future actions. Other writers (e.g., Sheffield, 1961; Bandura, 1969) have pointed out that the importance of attention-focusing manipulations for observational learning increases directly with the complexity or difficulty of the modeled performance, thus suggesting a possible test of Liebert and Fernandez' interpretation. Specifically, to the extent that the attention-focusing explanation of vicarious reward is tenable, such observed consequences would be expected to enhance the effects of direct reward increasingly as the modeled task increases in complexity. Exploration of this hypothesis was the primary purpose of the present experiment. Additionally, to explore further the potential educational significance of imitative learning, the present experiment was specifically designed to accommodate a substantive learning task and employed a pre-test to establish each child's expertise prior to the experimental modeling session.

Method

Subjects

The Ss were 36 children, 18 boys and 18 girls, 6-7 years of age, from a public elementary school serving a middle-class area of Nashville, Tennessee.

An equal number of children of each sex was randomly assigned to the cells of a 3 (complexity) x 2 (presence or absence of vicarious reward) factorial design.

Task

The task materials were nine color slides, each of which labeled and depicted three U.S. states. For this experiment three sets (i.e., A, B, and C) of three slides each were created and one state on each slide was arbitrarily designated as the "target."

The task itself involved correctly identifying (i.e., pointing to) the target state for each slide when asked to do so. For the high complexity condition all three sets (i.e., a total of nine slides) were presented, for the moderate complexity condition two sets of slides were presented, and for the low complexity condition one set was used. In order to control for possible differences in difficulty level among the sets, those employed in the moderate and low complexity conditions were systematically varied. Thus, one third of the Ss in the low complexity condition were exposed to set A, one third to set B, and one third to set C. Similarly, in the moderate complexity condition an equal number of children were exposed to each of the following combinations: AB, AC, and BC.

Procedure

Each child was brought individually to a mobile research laboratory by E, an adult female, and introduced to the model (M), a second adult female. E explained to both M and S that she worked for a toy company which made educational color slides and wished to show them to children and adults. She further explained that, as the slides were shown, performers would be asked to answer a question about each.

In order to pre-test each child's initial knowledge of the task to which he would be exposed, E first presented S with either three, six, or nine slides, as explained above. As each was displayed, E asked S to name the target state (i.e., "Can you tell me which one is [state name]?"). If S did not point to a state, he was asked to guess. Children who responded virtually perfectly on the pre-test were excluded from the remainder of the study.[2]

S was next asked to watch while M took her turn. During her performance, in all groups, M always correctly identified the target state. In the vicarious reward groups M was rewarded by E after each response with both verbal praise (e.g., "Good. That's the right one.") and with a token which E explained could later be exchanged for a prize. For the remaining groups (vicarious reward absent) E merely responded to each of M's responses with the statement: "Now we'll go on to the next one."

Following M's performance, E told the child that it was his turn again. However, she explained that this time S was to point to the state which M had chosen and that each accurate match would be rewarded with a token. Note that Ss were asked to reproduce M's selections, rather than to name the "correct" state, since children in the vicarious reward absent groups might not be certain that M's responses had been uniformly correct. Finally, at the end of the session, E exchanged S's tokens for a prize, praised both participants for their performance, and thanked them for their help.

Dependent Measures

In order to permit direct comparisons among the groups, the number of correct responses (i.e., accurate identifications during the pre-test and accurate matches during the post-test) for each S were transformed to a common base so that a score of 9 would reflect perfect performance for any S, a score of 6 would mean that two-thirds of the child's responses were accurate, and a score of 3 (one-third correct) would indicate mere chance performance.

Results and Discussion

After the transformation described above, the data were subjected to a 3 x 2 analysis of covariance, with Ss' transformed pre-test scores serving as the covariate.[3] Pre-test, post-test, and adjusted means are presented in Table 1, from which it is apparent that on the post-test (1) performance was inversely related to complexity and (2) vicarious reward served to increase the number of correct matching responses. Moreover, the analysis revealed that the effects for both complexity ($F = 6.94$, $df = 2/29$, $p < .01$) and vicarious reward ($F = 4.96$, $df = 1/29$, $p < .05$) were reliable.

Insert Table 1 about here

In order to determine the effects of vicarious reward within complexity levels, individual comparisons were performed. These comparisons revealed that vicarious reward had a significant effect for Ss in the high complexity condition ($t = 1.92$, $p < .05$, one-tailed), tended to enhance the performance of Ss in the moderate complexity condition ($t = 1.20$), and had only negligible effects for Ss exposed to the low complexity task ($t = .72$).

The overall results of this experiment are consistent with the hypothesized operation of vicarious reward on which the study was based. Thus, even in the presence of direct reward for matching responses, children who had observed a rewarded model performed better than those whose exemplar received no consequences. However, as expected, vicarious reward had a negligible effect when only three responses were modeled[4], greater influence when six responses had been modeled and, for the groups in which nine selections had been observed, produced approximately 22% more matching responses than did its high complexity no consequences counterpart (Table 1).

These data also provide additional support for the hypothesis that observational learning can be harnessed for applied purposes. In fact, to explore this potentiality one step further, a recent pilot study, using the state-slide materials and a comparably re-tested control group, replicated the modeling effect reported here and suggested that the learning produced by such a brief exposure is durable for a period of at least three weeks (Fernandez and Liebert, 1969).

Finally, apart from further elucidating the processes which underlie observational learning and imitative performance, the present study suggests some intriguing hypotheses for future research. For example, consider the situation in which children observe models who are severely punished for reprehensible behavior. While persons witnessing such reprisals would hardly be likely to reproduce the negatively sanctioned behaviors spontaneously, punishment, like reward, might direct their attention to the model's untoward acts and thus enhance future recollection of them. Ironically, if this reasoning is correct, children exposed to such vicarious punishment would be able to reproduce more of the modeled responses when the contingencies favored doing so than would observers who had seen the same behaviors displayed without consequences.

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Table 1

Pre-test, post-test and adjusted treatment means of transformed scores for all groups.

	Complexity		
	High	Moderate	Low
<u>Vicarious Reward</u>			
Pre-test	4.17	2.75	5.00
Post-test	7.33	7.00	9.00
Adjusted	7.28	7.41	8.68
<u>No Vicarious Reward</u>			
Pre-test	4.17	3.00	5.00
Post-test	6.00	6.25	8.50
Adjusted	5.95	6.58	8.18
Difference between adjusted means	1.33	.83	.50

Footnotes

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[2]Thirteen children (four in the low complexity condition, seven in the moderate complexity condition, and two in the high complexity condition) were correct on more than 80% of the pre-test trials.

[3]Since inspection of the data revealed no sex differences, the sexes were combined for the covariance analysis.

[4]Not surprisingly, inspection of Table 1 reveals that low complexity Ss performed almost perfectly even in the absence of vicarious reward. Note, however, that pointing to this "ceiling" effect is merely an alternative way of stating our thesis and not a rival explanation. That is, this observation merely implies that simple tasks can be mastered observationally without an attention-focusing manipulation (e.g., vicarious reward) and will thus mask the potential effects of such treatments, an interpretation synonymous with the one we have offered.