more directly sensitive to the emotional arousal which often accompanies overt acts of violence (see, e.g., Baron & Kepner, 1970). Thus, in the present study, exposure to the calm, nonemotional model may have served to lower Ss' own emotional arousal, but failed to reduce their desire to inflict pain and suffering on the victim. As a result, the model was effective in reducing the duration but not the intensity of attacks against the anger instigator. Direct evidence concerning these suggestions may be obtained in future research by relating verbal reports concerning Ss' desire to harm the victim to the intensity of the shocks they employ, and relating physiological measures of emotional arousal to the duration of such attacks.

In contrast to initial predictions, degree of observer-model similarity failed to affect the magnitude of the aggression-inhibiting influence of the model. Thus, it appears that degree of apparent similarity in social background to a nonaggressive model is not an important determinant of the adoption of similar patterns of restrained behavior by adult observers. However, future research is needed to determine whether similarity along any of several additional dimensions (e.g., attitudes, age, sex, race,

personality) may be of greater importance in this regard.

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NOTES

1. In both groups, the answers of C1 suggested that he was moderately similar in social background to the S.
2. A preliminary analysis indicated that there were no differences between the paid and unpaid Ss. Thus, their data were combined in all subsequent analyses for both dependent measures.

Solution of the transverse patterning problem: Response to cue-cue relations

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The transverse patterning problem was studied in adult human Ss. As hypothesized, the addition of a nonspatial dimension varying among the settings comprising the cue-cue patterns decreased the difficulty of this discrimination task. Contrary to Spence (1952), a number of Ss solved the problem by means of responding to the cue-cue patterns, even though the additional nonspatial dimension permitted solution on the basis of a less complex type of pattern.

Spence (1952) devised a problem which cannot be solved on the basis of responding either to a single reinforced component, as in the simultaneous discrimination, or to a cue-position compound, as in the standard successive problem. This "transverse patterning" discrimination, as Spence (1952) referred to it, consists of three different stimuli presented in pairs. According to Spence, solution of this problem requires that the organism

approach or not approach a particular stimulus, depending upon what other stimulus is paired with it. In other words, the effective stimulus is a cue-cue relation, or pattern.

As illustrated in Fig. 1, the transverse patterning problem consists of three such cue-cue relations. Since position is an irrelevant dimension in this task, the combined settings, 1 and 4, 2 and 5, and 3 and 6, comprise the three patterns. Note that any two of

these cue-cue patterns differ with respect to only one value on the form dimension. Consequently, anything which would increase the distinctiveness of these patterns should facilitate learning the discrimination. There is evidence that reducing the similarity of the settings comprising the standard successive discrimination facilitates its solution (Lubker, 1969). This has been achieved by increasing the number of nonspatial dimensions varying between the settings of the problem. Similarly, in the oddity discrimination task, increasing the number of nonspatial dimensions along which the reinforced stimulus is odd, decreases the difficulty of this problem (Croll, 1967, Experiment II).

The purpose of the present experiment was to determine if the addition of the nonspatial dimension, color, varying among the settings comprising the three different cue-cue relations, would facilitate solution of the transverse patterning problem.

PROBLEMS

The transverse patterning problem, as illustrated in Fig. 1, consisted of three black geometric forms presented in pairs. The addition of the color dimension resulted in what will be referred to as the "color pattern" task. This problem consisted of the same pairs of geometric forms, but the settings comprising each of the three cue-cue patterns differed in color. The three colors, red, yellow, and blue, are represented in Fig. 1 by white, horizontal lines, and vertical lines, respectively. The plus signs stand for reinforced and the minus signs for nonreinforced.

MATERIALS

The stimuli were constructed out of colored posterboard. They included all possible combinations of three forms—triangle, circle, and square—and four colors—black, red, yellow, and blue. The dimensions of the forms were: square, 3.5-in. side; circle, 3.75-in. diam; triangle, 4-in. base, 3.5-in. height. Two complete sets of stimuli were constructed.

SUBJECTS

The Ss were 24 students enrolled in an introductory psychology course at California State College, Los Angeles. Twelve Ss (six males and six females) were assigned randomly to each of two groups, one which learned the transverse patterning problem (Group TP) and the other, the color pattern problem (Group CP).

PROCEDURE

Upon entering the experimental room, the S was seated across a table from the E and given the following instructions: "I am going to show you some geometric forms, two at a time. Each time, point to the one you think is right, and I will say either 'right' or

SETTING	TRANSVERSE PATTERN		COLOR PATTERN		TEST
	LEFT	RIGHT	LEFT	RIGHT	
1	(+)	(-)	(+)	(-)	(c) (p)
2	(+)	(-)	(+)	(-)	(c) (p)
3	(+)	(-)	(+)	(-)	(p) (c)
4	(-)	(+)	(-)	(+)	(c) (p)
5	(-)	(+)	(-)	(+)	(c) (p)
6	(-)	(+)	(-)	(+)	(c) (p)

Fig. 1. Illustration of the transverse patterning problem, color pattern problem, and test trial stimuli. White = red, horizontal lines = yellow, vertical lines = blue, + = reinforced, - = nonreinforced, c = color-form compound, p = cue-cue pattern.

'wrong.' It is possible to get me to say 'right' every time. Your task is to try to get me to say 'right' every time."

A trial consisted of the presentation of one setting. For each group, the six settings comprising their problem were presented within each of 15 blocks of 6 trials in a prearranged random order, with the restriction that neither position would be correct more than three times in succession. A different order was used for each of the blocks. All Ss were run to a criterion of 12 consecutive correct responses (two complete blocks in succession) or a maximum of 90 trials. Six subgroups were formed within Group CP to counterbalance for the colors associated with the different cue-cue patterns. Each subgroup received one of the six possible color-pattern combinations, with the colors of the settings remaining constant throughout training for each S. To control for extraneous cues, such as smudges, the appropriate stimuli from the two complete sets of materials were paired at random from trial to trial.

Immediately following attainment of the criterion, each S in Group CP was given three test trials. These trials were designed to reveal the basis upon which the addition of the color dimension might facilitate solution of the transverse patterning problem. On each test trial, one of the previously correct color-form compounds was

paired with a color-form compound which had never been used during training. For example, as shown in Fig. 1, the first test trial setting consists of a red triangle, which was correct in Settings 1 and 4, and a red square, a compound not used in training. Although the color dimension was added in order to increase the distinctiveness of the the cue-cue patterns, it concomitantly permitted solution on the basis of learning to respond to the color-form compounds per se, i.e., red triangle, yellow square, and blue circle. Thus, if the S chose the red triangle on the first test trial, one could conclude that he had learned to respond to the color-form compound (c) regardless of what other stimulus was paired with it. Selection of the red square, however, would indicate that the effective stimulus during learning was the cue-cue pattern (p), i.e., square when presented with triangle. The order in which the test trials were presented was prearranged to counterbalance for the position of the two possible types of effective stimuli.

RESULTS

Since inspection of the data indicated no differences in number of trials to criterion among the counterbalanced conditions, the data of the six subgroups in Group CP were combined for further analysis. The number of Ss who reached criterion in Groups CP and TP were 12 and 6,

respectively. These data were subjected to a chi-square test for independent samples, which indicated that there was a significantly greater proportion of learners in Group CP than in Group TP, $\chi^2 = 5.56$, $df = 1$, $p < .02$. Medians of the number of trials to the start of criterion were 21.3 for Group CP and 75.5 for Group TP. A Mann-Whitney U test performed on the trials-to-criterion scores revealed that Group CP learned significantly faster than Group TP. $z = 3.16$, $p < .0016$.

On the first test trial, six Ss in Group CP responded on the basis of the color-form compound (c) and the other six on the basis of the form-form pattern (p). Only 3 of the 12 Ss made a combination of compound and pattern responses over the three test trials.

DISCUSSION

The fact that Group CP performed significantly better than Group TP demonstrates that the addition of a nonspatial dimension varying among the settings comprising the different cue-cue relations decreases the difficulty of the transverse patterning problem. In referring to the behavior primarily of nonarticulate organisms, Spence (1952) suggested that Ss would respond to cue-cue relations only if conditions did not permit solution on the basis of a single component or some simpler type of cue-position pattern. As noted earlier, in the present experiment the addition of the color dimension made it possible for the Ss in Group CP to solve the problem by means of responding to the color-form compounds. A color-form compound is a simpler type of pattern than a form-form relation, in the sense that the color and form cues are spatially overlapping, whereas the two form cues are not. Nevertheless, the test trial results indicate that half the Ss in Group CP learned on the basis of responding to the form-form relations. Thus, contrary to Spence's (1952) view, Ss (at least adult human ones) may solve the transverse patterning problem by means of responding to the cue-cue relations, even though conditions permit solution on the basis of a less complex type of pattern.

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