*REINFORCED RACIAL INTEGRATION IN THE FIRST GRADE:
A STUDY IN GENERALIZATION¹*

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This study investigated possible factors in promoting racial integration, a matter of practical concern in schools today. Specifically, the effect of social and tangible reinforcement was studied on the social integration of five black children in a predominantly white classroom. "Sitting and seating with a new friend" in the school cafeteria was manipulated by (a) teacher directive combined with reinforcement and (b) by positive reinforcement alone. Treatment effectiveness was studied in the cafeteria and as generalization effects to a free-play period. The results indicated that reinforcement produced significant generalization to integrated free play, although intersubject variability was present. Evidence suggests that reinforcement techniques can be used effectively to promote social integration.

A problem of practical import and of great relevance is the current educational concern for enhancement of social interaction between children of different races. Enforced physical integration has been shown in the past to effect attitudinal changes (Deutsch and Collins, 1951), as has required role playing (Culbertson, 1957). Mann (1959), however, demonstrated that procedures that were effective in producing changes in the cognitive aspects of prejudice did not produce corresponding behavioral changes. Both educators and social scientists are cognizant of the fact that enforced physical integration may well prove to be a necessary but not sufficient condition for reducing prejudice (Horowitz, 1936). More importantly, integration in a "demand" situation may not generalize to spontaneous or voluntary social interactions (Minard, 1952). Quite probably, social integration must be arranged so that the interaction is associated with positive events.

In recent years, a number of studies have been reported dealing with the general class of reinforced social interaction. Kale, Kaye, Whelan, and Hopkins (1968) successfully manipulated social greetings in withdrawn schizophrenics,

Horton (1970) reinforced non-aggressive play in pre-delinquent boys, Whitman, Mercurio, and Caponigri (1970) reinforced social responses in severely retarded children, and Hart, Reynolds, Baer, Brawley, and Harris (1968) dealt successfully with cooperative play and social proximity in a 5-yr old in a school setting. Clearly then, social integration can be operationally defined and consequated as an operant in a circumscribed and controlled environment. Of perhaps greater interest, however, is the design of conditions that will maximize the generalization of desirable behaviors beyond the experimental setting into the natural social environment.

In the studies cited above, generalization was obtained. Horton (1970) and Whitman *et al.* (1970) reported generalization to new situations not programmed with reinforcement, and Kale *et al.* (1968) specifically taught generalization of social responses to a new experimenter. Imitative responses have been shown in many studies to be a generalized response-class under given setting conditions (Wheeler and Sulzer, 1970; Peterson and Whitehurst, 1971; Burgess, Burgess, and Esveldt, 1970). Yet failures of generalization have also been reported (Wahler, 1969). Among the important conditions that seem to maximize the probability of obtaining generalization are: (1) similarity of response topography (Garcia,

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Baer, and Firestone, 1971), (2) similarity of stimulus topography (Horton, 1970), and (3) temporal proximity to the reinforced stimulus situation (O'Brien, Azrin, and Henson, 1969).

The present study was initiated after a report by a first-grade teacher of concern about reticence of both black and white children in her class to integrate spontaneously during free-play activities despite persistent attempts by the teacher to encourage the children to do so.

METHOD

Subjects

Five first-grade black children, from a group of seven, six boys and one girl, served as subjects. Examination of baseline data on the seven children indicated that two should be excluded from the study. One child did not have an interaction problem; her baseline lunch-room behavior showed 100% daily interracial interaction. Another child was not included because of extensive absences during the experiment.

All 25 pupils in the class received positive reinforcement for sitting at lunch with a "new friend", so that the black children were not singled out specifically. That is, each day the teacher kept track of who sat together, and the next day reinforcement was delivered to all children (black and white) who chose a lunch mate different from the previous day. Data reported in the present experiment cover only the number of interracial interactions.

Before the experiment, all five black children consistently isolated themselves in a block for all activities of a social nature. They chose to eat exclusively together, and grouped themselves together in all activities in which pupils were given free choice. This social clustering continued despite the teacher's attempts to encourage social integration.

Observation Procedures

During the lunch periods throughout the experiment, the teacher was totally in charge of rating the occurrence of lunch-room interactions.

The presence or absence of the interaction was judged to be easily observable; however this was not assessed by using another observer. The teacher also dispensed the tickets in the lunch-room during the prompting and experimental phases.

Throughout the entire experiment, children were observed each school day for a total of 30 min of free play in addition to observations of lunch-room behaviors. For the first three days of the baseline period, both the teacher and an observer tallied data independently during the free-play period. There was 100% interjudge agreement, and thereafter only the observer collected data. The behaviors were judged to have remained comparatively discreet and easy to observe throughout the study.

Lunch-room behavior. The operant "lunch-room interaction" occurred in the school cafeteria where children had always been allowed to choose any seat. Each table was small, accommodating four pupils. Often children informally added a fifth place. Each lunch period throughout the experiment, each of the five children was rated Yes or No according to whether he shared a lunch table interracial while eating his lunch. The lunch period was 30 min long.

Free-play behavior. Immediately after lunch, all pupils returned to their classroom for a 30-min free-play period. Generalization effects were measured as interracial free play by the five black children. In order to score a play interaction, the child was required to become involved with another child of a different race (e.g., by sharing a toy, playing reciprocally, or romping together). Independent parallel play, although in close proximity to another child, was not considered play interaction. Neither was arguing nor fighting, although this latter form of negative interaction did not occur during the experiment. Data were collected only during the middle 20 min of the 30-min period. The first and last 5 min of the period were eliminated because of logistic problems related to taking out and putting away toys, or late arrival from the

cafeteria. The 20-min period was divided into ten 2-min consecutive blocks of time.

Throughout all free-play periods, no direct or indirect attempts were made by the teacher or aide to encourage play interaction, nor were spontaneously emitted play interactions responded to by the adults.

During the 2-min blocks, the observer tabulated whether each of the five black pupils played interracially. If interracial play occurred within a defined 2-min block, that child was credited for the full 2-min period, even if play interaction was not sustained for the full 2-min. Thus, if even brief play interaction occurred at some time within each of the ten 2-min time blocks, the child was credited with an optimal generalization score of 10 for that day.

Baseline I Period

Baseline observations were collected for nine consecutive school days, during lunch period and during free-play time immediately thereafter. No attempts were made during this phase to reinforce interracial sitting and eating together.

Prompting Phase

Since the teacher had reported such a low general operant level of interracial lunchroom behavior and the baseline data corroborated this, it was decided that a prompting device was necessary to initiate the behavior. Thus, for four consecutive school days as children lined up in their room before walking to the cafeteria, the teacher announced a game whereby children would eat lunch with a "new friend". She produced a hat containing pairs of children's names. The teacher encouraged all children "to sit in the cafeteria and to eat with your new friend". Each black pupil was paired with a white child and consistent cliques of white pupils were mixed and paired with other white pupils. Nothing was ever spoken about race, *per se*; throughout both the prompting and experimental phases, teacher remarks centered upon "new friends". When seating patterns in the cafeteria were established and the children were

eating, the teacher immediately went to each table and if the children were settled with the partner assigned, she said "Good! I'm glad you are sitting with your new friend". She then gave those children a 2 by 3 in. pink oaktag ticket, saying: "This is for sitting with a new friend today. Later on, at recess, you give me your pink tag, and I will give you something good to eat." When the 30-min lunch period was nearly ended, the teacher went to the children again and gave them a second ticket if they had remained together with their "new friend". Thus, children could receive 0, 1, or 2 pink tags according to their lunch-room social integration behaviors. Later, during afternoon recess, each pink tag was redeemed for a cookie, candy, pretzel, *etc.*, which varied daily. The second, third, and fourth days of the Prompting Phase followed the same procedure as Day 1 except that on each day before lunch, the teacher changed the names on the name pairs in the hat.

Experimental Phase

This phase continued for nine consecutive school days. It differed from the Prompting Phase only in that no longer did the teacher use the names-in-the-hat technique. As the children lined up for lunch, she encouraged the group as a whole to "sit and eat with new friends". Reinforcement in the cafeteria was continued, contingent upon appropriate sitting-and-eating integration. Both black children and white children were treated and rewarded alike throughout the experiment, despite the fact that data were kept only on the five black children.

Baseline II Period

This period continued for five consecutive school days. All conditions were carried out exactly as in the Baseline I Period.

RESULTS

The combined results for all five children can be observed in Figure 1, which presents data on lunchroom interactions and generalized free-play interactions. The most important compari-

Fig. 1. Mean per cent of interracial seating in lunch room and generalized interracial free play. In the "PROMPT" condition children were assigned specific interracial seatmates at lunch and given redeemable tickets for sitting with them. In the "EXPL PHASE" children were no longer assigned seatmates but were still given tickets contingent upon interracial seating at lunch.

son was the generalized free play during the nine days of Baseline I and the nine days of the Experimental Phase. A Randomization Test for related samples showed that the mean generalized play interactions for the entire group during the Experimental Phase (when lunch-room interactions were reinforced) were significantly higher (5.6) than during the Baseline I period (2.7), $p < 0.02$.

A breakdown of the pooled data into individual analyses (see Table 1) proved to be significant also, although individual daily variability was high, which can be seen in Figure 2. A Randomization Test for differences between the individual mean scores during nine baseline days and nine experimental days showed a significant increase in generalized interactive play during the experimental period ($p < 0.04$). Each of the five black children spontaneously increased his play interaction with white children.

Baseline I Period

It can be seen that for eight of the nine baseline days, no more than one in five of the black pupils sat and ate at a table with a white child. On Day 8, all five children were credited with interaction because one white pupil joined them at their isolated table, crowding in six pupils. For the entire Baseline I period, the mean lunch-

room interaction was 0.08 out of a possible score of 5. Generalization baseline was moderately low. The group mean free-play interaction was 2.7 blocks of time.

Prompting Phase

During the lunch-room period, an increase in interactions to 80% during the Prompting Phase compared to 17% during Baseline I was observed. On the first day, three children ignored the name-pair game and sat together as a block. The pairing technique during the Prompting Phase did not lead to generalization effects at all. Figure 1 shows a decrease in generalized free-play interaction during the Prompting Phase, with a mean of 1.6 blocks of integrated play compared to 2.7 blocks of integrated play during Baseline I.

Experimental Phase

During the nine days of the experimental phase, it can be seen that black and white students sat together on over half the total opportunities under the reinforcement contingency. The mean interaction was 2.7 (58%), which was much higher than in Baseline I (17%) but lower than under the prompting directive. As can be seen, however, the generalization effects were significantly higher than in either Baseline I or

Table 1

Individual per cent of social interaction in lunchroom (LR) and in generalized free play (GFP).

Subjects	Baseline I		Prompt		Experimental		Baseline II	
	LR	GFP	LR	GFP	LR	GFP	LR	GFP
1	0.33	0.27	0.50	0.08	0.50	0.46	0.40	0.24
2	0.22	0.34	1.00	0.25	0.55	0.55	0.00	0.13
3	0.11	0.40	0.75	0.18	0.78	0.58	0.00	0.26
4	0.11	0.17	1.00	0.20	0.55	0.63	0.20	0.22
5	0.11	0.20	0.75	0.15	0.50	0.46	0.00	0.04

the Prompting Phase. Apparently, reinforcement for *spontaneous* interracial behavior at lunch increased the tendency to interact later interracially in a free-play situation. Fluctuations in generalized play interaction during the experimental phase parallel the patterns of fluctuations in lunchroom behaviors, day by day, during Days 14 to 21. Only on Day 22 was there an increase in lunch behaviors that did not lead to an increase in generalized play interaction. The generalized free-play interaction during the Experimental Phase ($\bar{X} = 5.6$) was significantly higher than during the Baseline I Period ($\bar{X} = 2.7$), $p < 0.02$.

Baseline II Period

Baseline II was conducted for five days only. Data showed that the children rapidly returned to Baseline I behavior. The lunch-room interactions, with concrete reinforcers removed, dropped to 16%, which is very similar to Baseline I behavior, 17%. The free-play interaction also dropped drastically; $\bar{X} = 1.62$, which was lower than Baseline I ($\bar{X} = 2.7$) and similar to the Prompting Phase ($\bar{X} = 1.6$).

DISCUSSION

This experiment produced two main results that are noteworthy. One was the evidence that reinforced lunch-room interactions can lead to generalized positive effects. The other was that the data showed unstable trends despite a significant difference between baseline and experimental periods. This finding was disappointing,

and suggests that perhaps each phase should have been continued longer in an attempt to determine if stable behavior could be established under these conditions.

The interpretation of the functional relationship between reinforced lunch-room behavior and the generalized play during the Experimental Phase remains an interesting puzzle. The data suggest that the generalization effects were associated with "lunch choice" operants that were immediately reinforced. However, it is noteworthy that the generalization did not occur during the Prompting Phase. Possibly the prompting period was too brief to produce generalization results. Perhaps also children who followed the teacher's directive to "sit with a new friend" did so with some reluctance and hence were not motivated to select their new friends later in free play. Whatever the causal factors, the results supported the findings of Minard (1952). The question remains whether significant generalization would have occurred during the prompting phase if that phase had continued longer or whether generalization depended upon the spontaneous emission of the response followed by reinforcement.

At least three independent factors may have influenced the generalization results that were obtained; any may have contributed to the variability of the data: time proximity, response similarity, and environmental stimulus similarity. Although the present experiment was not designed to evaluate these factors, all have previously been shown to be relevant dimensions in obtaining generalization.

Fig. 2. Individual interracial seating in lunch room and generalized interracial free play of five black children.

First, the time proximity factor probably was important, since the free-play time almost immediately followed the lunch-room reinforced operant and thus probably enhanced generalization. There was, however, a 5-min intervening period during which the children were required to move a long distance from the cafeteria to the classroom, and in this short period movement was informal, often involving frolicking between children. This rearrangement may have been an interfering factor in obtaining more consistent generalization. On the other hand, it is interesting to speculate as to whether the generalization effects would have diminished if the free-play period had been conducted much later in the afternoon.

Second, the response topographies were not very similar. The operant "playing together" was topographically quite dissimilar to the operant "sitting together". According to the literature, this dissimilarity might have contributed to reducing the amount of generalization.

Third, the environmental stimuli were dissimilar. The original reinforced behavior took place in the lunch room with tables, lunches, and food-related physical cues, while the generalized operant of free play was measured in a room far from the cafeteria, with physically different stimuli of toys and games. It is true, of course, that the entire school setting has its own unique aura of stimulus cues, and to that extent, the environment shared a stimulus similarity.

The recovery of baseline performance in the last phase of the experiment was anticipated, yet the rapidity with which it was achieved was disappointing. It is well recognized that if there are to be practical gains from an experiment of this type, concrete reinforcement of lunch-room integration would need to be faded out eventually while both lunch-room operant and generalized free-play are maintained. In the present study, it is probable that extinction occurred rapidly because (a) the experimental phase was short, and (b) intermittent reinforcement of "sitting and eating together" was not scheduled. It would be hoped that sitting and eating to-

gether, with its natural social interactions and associated pleasurable consequences, would begin to maintain the lunch room integration, but it would probably take longer than nine days to produce longer-lasting effects. It is, of course, possible that interaction with new friends does not easily produce natural or intrinsic reinforcements.

In reviewing the results of this experiment, certain limitations of design and data collection became apparent, and some interesting questions remain unanswered. For example, during the periods when reinforcement for the lunch-room operant was available, a child could earn zero, one, or two tickets, depending on whether or not he emitted the response and maintained his seating arrangement throughout the lunch period. Data were not kept, however, on the actual number of tickets earned per day for each child; therefore, it is impossible to interpret the differential effects this variable may have had across conditions.

Another problem was that the data did not show who initiated the social interaction during lunch or at free play. It cannot be determined, therefore, whether the reinforcement contingencies resulted predominantly in an increase with which white children initiated social interaction with blacks or *vice versa*. Although we cannot say whose behavior changed (white or black children), the data do indicate an effective application of behavior analysis to change behaviors.

Another question raised is whether the children who played together in free play were the same children who had been rewarded for being tablemates. In addition, data were not kept on the behavior of white children interacting with other white children (clique behaviors) and it is not known whether reinforcement contingencies were equally effective in rearranging these groupings.

Overall, however, the generalization effects obtained were encouraging because significant generalization did occur, albeit inconsistently. It is clear, however, that this experiment opened many questions about the generalization, the

possible effects of extending the duration of experimental treatments, and of maintaining the operants while thinning out the amount of concrete reinforcers. It is hoped that future research will help determine which factors are necessary and sufficient to obtain more consistent and durable generalization.

The results of this investigation suggests that reinforcement can be a promising tool for dealing with problems of racial integration. The study showed that the global concept of racial integration can be specifically defined and manipulated in order to bring about the desired social integration. Many people assume that racial integration must begin with an attitude change which, hopefully, will then result in some generalized positive behavior change. The present study, however, indicated that positive behavior changes can be brought about directly.

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