GOOD-BEHAVIOR GAME: A REPLICATION AND SYSTEMATIC ANALYSIS[1]

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A good-behavior game was implemented in a fifth-grade reading class consisting of two groups of 14 students each. After the presentation of the game, reversal and component analysis phases were instituted. Game components included rules, lights (response feedback), and group consequences of extra recess and extra free time. Student observers recorded the dependent variables which included talking-out, disruptive, and out-of-seat behaviors. The results show that the game reduced the dependent measures from their baseline rate by almost 99% for one group and 97% for the other. The component analysis revealed that after association in the game, the stimulus components of rules and lights were effective in reducing the dependent behaviors.

The technology for successfully managing classroom behavior has undergone considerable refinement within the last few years. Some of the early reports were either philosophical in nature (Ulrich and Stachnik, 1965) or were conducted in specialized settings (Birnbrauer, Wolf, Kidder, and Tague, 1965). But more recently, the technology has been utilized in typical classrooms with remarkable effectiveness (Madsen, Becker, and Thomas, 1968; Schmidt and Ulrich, 1969; Schutte and Hopkins, 1970).

One of the simplest yet most powerful procedures employed to date has been designated the "good-behavior game" (Barrish, Saunders, and Wolf, 1969). The present study evaluated the efficacy of the game in controlling two reading groups during independent study and teacher-directed lessons. It also afforded a systematic analysis of the game components, which included rules, response feedback (rules plus

lights), and group contingencies of extra recess and extra free time (Osborne, 1969). The target behaviors included out-of-seat, talking-out, and disruptive responses. The observing and recording procedures employed utilized student observers as described by Surratt, Ulrich, and Hawkins (1969).

METHOD

Subjects and Setting

The students that participated in the study were 28 fifth graders enrolled in a public school. They were divided into two separate reading groups, each of which had one month's participation in a basic reader program before the study began. It was during this program that the class became virtually uncontrollable and the modification techniques were instituted by the teacher (the first author). The students were nearly all grade-level readers or better. The experimental sessions were from 8:40 to 9:30 a.m., of which 40 min were used to record the behaviors in question.

The study was conducted in a standard public school classroom with the usual classroom facilities. During the study, the groups were separated by turning the desks 45 degrees from the front of the room, each group turning in the opposite

direction. Throughout the study, the student observers operated the apparatus and recorded from behind the reading groups. There was no explicit contact between the children and the observers.

Apparatus

Two standard 120-v light receptacles were fitted with a red and a green light positioned in view of the group, each with its own set of lights. The lights were manipulated by the student observers with a control box that contained two silent, single throw switches; one controlled the green and one the red light.

The recording sheet used by the observers was a modified seating chart drawn on 8.5 by 11 in. (21.6 by 28 cm) paper. The seating chart contained a box for each child, which at the top contained his name and the rest of which included specific areas to record each of the target behaviors.

Recording Procedure

Observer training. Two high school students volunteered to help the teacher-experimenter in the classroom by serving as observers; observer training took one week. Several days were devoted to memorizing behavioral definitions and examples applicable to the definitions. Several more days were spent in the classroom practising recording and adjusting the definitions to fit as many situations as possible.

Observation techniques. Each observer recorded the behaviors of a group of 14 students. The observers individually scored every member of their group on each of the behavior categories. Group results were totalled at the end of the recording period and left in a convenient place for the teacher, so that he could inform the class of their performance.

In scoring the dependent measures it was decided that since behaviors are of a continuous nature, the observers would record only the response that started a chain. For example, when a student left his seat, went to the wastebasket, and in the process whispered to another student,

he was marked only for out-of-seat behavior because it initiated the sequence. The unit of behavior ended when the student returned and engaged in some appropriate behavior, such as sitting quietly or reading. This meant that any non-target behaviors ended a sequence. There was no latency criterion to separate different response sequences. The onset of non-target behaviors appeared to be adequate for the observers to record without any problem.

Reliability. Periodic inter-observer checks were made to determine the students' reliability as observers. The percentage of agreement between the records was calculated as the number of agreements times 100 divided by the number of agreements and disagreements. For a tally to be scored as an agreement, the tally had to be recorded for the same subject and within the same behavior category by both the observers (checker and student-observer). The teacher-experimenter made two checks of 4 min duration on each observer during $baseline_1$ and the results of all checks were 100% agreement.

Behavior definition. The behavioral definitions were constructed from those used by two previous experimenters (Barrish, *et al.*, 1969; O'Leary, Becker, Evans, and Saudargas, 1969) with only enough modification to fit the particular classroom situation. The definitions were as follows:

Out-of-seat behavior was defined as leaving the seat and/or seated position during a lesson. Exceptions to the definition, and instances not recorded, included out-of-seat behavior that occurred when pupils went one at a time to the teacher's desk during independent study assignments; when pupils were changing orientation in their seat; when a child left to approach the teacher, but then noticed that someone else was already there or on his way and consequently returned to his seat.

Talking-out behavior was defined as talking or whispering without permission. It included, for example, talking while raising one's hand, talking to classmates, talking to the teacher, calling the teacher's name, blurting out answers,

or making vocal noise like howls, cat calls, animal sounds, *etc.*

Disruptive behavior was defined as motor behavior that disrupted the attention and/or activities of another student. For example: hitting, kicking, striking another child with an object, grabbing another's book, tearing up another's paper, clapping, stamping feet, turning to the person behind or looking to the rear of the room when the teacher was in the front of the class, *etc.*

Permission was defined as raising a hand, being recognized by the teacher, and receiving consent from him to engage in a behavior. If the teacher was not in the room, the student could engage in certain behaviors by raising his or her hand for 5 sec. The 5-sec delay procedure was designed to foster some measure of self-control by eliminating impulsive responses. These behaviors included sharpening a pencil and getting a dictionary or other book needed for an assignment.

Experimental Design

The study consisted of six phases: Baseline₁, Game₁, Baseline₂, Rules, Rules + Lights, and Game₂. Their introduction and design were as follows:

Baseline₁. This phase lasted five sessions and involved recording the target behaviors using the definitions stated above. The observers were introduced to the class the week before the phase began, after which the class appeared to largely ignore them. Because of the high rate of target behaviors, it was felt that five days was an adequate indicator of the problem situation.

Game₁. Since the reading groups were already in existence, it was not difficult to institute the procedures that constitute the good-behavior game. At the beginning of reading class the teacher made the following presentation. He explained that: (A) what they were about to do was play a game in which each reading group would try to win and that the game was to be played in reading class only; (B) when a team or teams won the game, the team or teams would

receive certain privileges (it was made clear that both teams could win); (C) there were certain rules that the teams had to follow to win the game (the rules were read to both groups and were based on the behavioral definitions used to record the target behaviors); (D) whenever one of the team members broke one of the rules there would be a mark against that team; (E) a team or teams would win if they received five or fewer marks per day; (F) winning would entitle them to 3 min of extra morning recess. If a team received 20 or fewer marks for a week, they would be awarded extra activity time the following Monday afternoon from 2:20 to 3:20 p.m.; a losing team would continue their scholastic assignments (this did not cut into class time very much because 40 min of that hour were previously for an end-of-day study time and recess); (G) if a team had an individual who precluded winning by getting four or more marks in one day, the group could vote to exclude that person from the group for a day, thus causing the person to miss participation in any activities won by the team that week. The individual would be put behind a screen in the back corner of the room on the next day to study alone (this timeout component was installed in order to avoid the problem children encountered by Barrish, *et al.,* (1969). In that study, two students were dropped from the game and the marks were not imposed on their teams); (H) the lights operated by the observers will be used to signal a team as to how they are doing. The green light means that "all is well" and the red light means that "someone has made an error and the team should be careful." (The red light went on for 30 sec when a target behavior occurred and stayed on for 30 sec after the last error, at which time the green light was switched back on.)

The rules were repeated each morning during this phase by dividing them into the three behavioral categories and asking the children for examples that fit each category. The teams were informed at the end of the class if they received extra recess or not. The extra recess was given

1 hr after the reading class each day. The phase lasted 10 sessions.

Baseline2. This phase was a return to baseline conditions. It was introduced by telling the pupils that the game would not be played any longer and that there would be no more extra recess or free time. An 11-day Easter vacation interrupted this phase between the eighth and ninth sessions. The phase lasted 20 sessions.

Rules. This phase was introduced by a re-presentation of the rules. The teacher introduced the rules by saying: "I would once again like to repeat the classroom rules." He then proceeded to do so by again dividing the class rules into the three categories and giving examples of each. This was done every day during this phase; the phase lasted five sessions.

Rules + lights. This phase, like Rules, was used to check the control that the individual components of the game had on the target behaviors. The teacher said that the girls in the back of the room had again volunteered to help the students follow the rules, and that they were going to operate the lights as before. It was then explained that there was to be no game, no extra recess, or free time. The rules were repeated every day in this phase, also; the phase lasted 10 sessions.

Game2. This phase was introduced by telling the students that they were going to play the game again. At this point, everything was introduced as in Game1. This phase lasted five sessions.

RESULTS

Figure 1 shows the combined behaviors for each group. For Group 1, the introduction of the game reduced the target behaviors by 99% (the figures have been rounded off to the nearest whole %). Group 2 showed an average reduction of 97%. The reduction was calculated by comparing the average of all Baseline1 sessions with the last five sessions of Game1. Each team lost one extra recess period in the phase: both times the team received one mark above criterion.

During Baseline2, the target behaviors started a gradual return. A comparison of the average of the last five sessions of Baseline2 with the five sessions of Baseline1, reveals that although the groups were returning to the Baseline1 rate, they had not done so by the end of the Baseline2 phase. Group 1 returned to only 33% of their Baseline1 rate; Group 2 returned to 82%. The groups reversed their positions in terms of rate of responding. Group 2, on the average, showing a faster return than Group 1 and ending up with a higher rate of responding.

Only the last five sessions of Baseline2 were used as a comparison with the other phase because the target behaviors showed a gradual increase throughout Baseline2. Thus, it was felt that a stable state had not been reached by the end of the phase.

The instatement of the Rules phase reduced the frequency of the target behaviors for both groups. The last five sessions of Baseline2, when compared with the mean of the five sessions of the Rules phase, showed a reduction of 24% for Group 1 and 38% for Group 2. Both groups were responding at about the same frequency during this phase, with variability in daily rate still present.

In the Rules + Lights phase there was a further reduction in the frequency of the target behaviors. When this phase was averaged against the last five sessions of Baseline2, Group 1 showed a reduction of 80% while Group 2 showed a reduction of 94% and met the previous reinforcement criterion during each session.

The Game2 condition showed a still further reduction in rate from the Rules + Lights phase. The number of responses for each group was almost identical to the Game1 rates, both groups being well below the limits set to earn extra recess and free time.

Figure 2 presents the scores of the four individuals who showed the highest rate of target behaviors in each group during Baseline1. The four individuals of Group 1 accounted for 44% of the group marks during Baseline1, and the
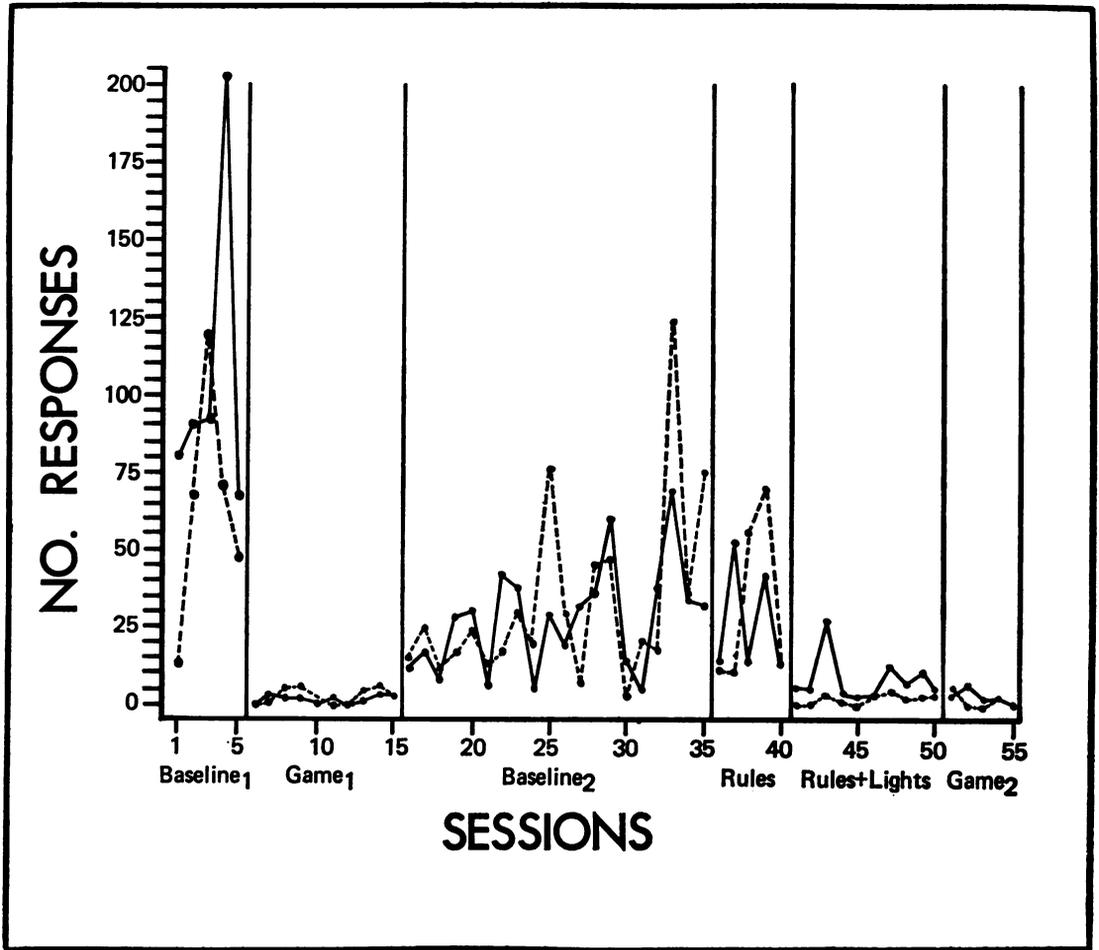
Fig. 1. The number of occurrences per session of talking-out, out-of-seat, and disruptive behaviors combined and presented for each team (reading group) of 14 students. During the Game phases, the emission of talking-out, out-of-seat, or disruptive behaviors resulted in the possible loss of privileges for the student and his team.

four individuals of Group 2 also accounted for 44%. With the reinstatement of baseline conditions (Baseline$_2$ phase) rates began to return to the previous level for most but not all of the individuals. During the last five sessions of Baseline$_2$, the four individuals of each group were emitting fewer responses than during Baseline$_1$, but the per cent of responses that helped make up the group totals increased; Group 1 individuals had 99% and Group 2 individuals had 50% of the total. The figure clearly shows the differential effects the Baseline$_2$ phase had on individuals, some returning to Baseline$_1$ rates quickly and some not at all or not until the

end of the 20-session phase. The game phases had the same effect on all individuals taking part in the study—almost total elimination of target behaviors. At no time during the game phase did any individual receive more than two marks in one day; thus, the timeout procedure was not employed.

DISCUSSION

The experimental design used in evaluating the game technique could have taken two basic forms: first, one in which the components would be presented before the game; second, one in
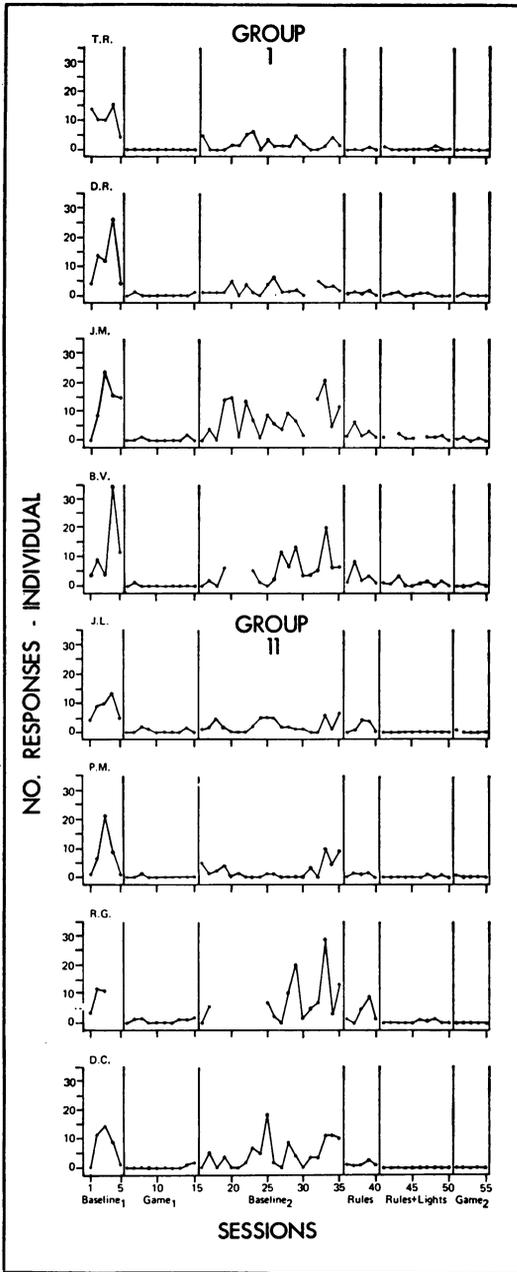
Fig. 2. The graphs present the records of the four students who emitted the largest number of target behaviors in each group during Baseline₁ phase. The behaviors of talking-out, out-of-seat, and disruptive have been combined in the individual graphs.

which components were separated after presentation of the game. Both designs have their advantages. The first design allows for the assessment of component control before their associa-

tion with the game and its free-time and extra-recess contingencies. This type of analysis has been done in evaluating a token reinforcement program (O'Leary, et al., 1969) and because of the results of that study the second experimental design was used here.

The second design allows for the assessment of component control after their association with the game and its extra-recess and free-time contingencies. The data derived from both designs and their variant forms is needed to complete the picture of the controlling variables involved. However, this study shows that the game had almost complete control over the types of behavior recorded and that the individual components of Rules and Rules + Lights after their association within the game, were effective in reducing behavior from its recorded baseline rate.

Due to the problems of the applied setting (the ending of the school year) and the unexpected data (long reversal, Baseline₂ phase), the investigators were not able to examine the component phase in the expected manner. It would have been interesting to have been able to extend the components to see if a stable state could have been reached and for how long. The Rule + Lights phase may have exerted control for a long period of time, the duration of which may be determined by characteristics of the game presentation—a short game phase may not foster a strong and lasting Rule + Lights phase, etc. Many other related and interesting questions remain.

The reduced frequency of the target behaviors during Baseline₂, especially for Group 1, was totally unexpected; and because this phenomenon has not shown itself in other studies of similar design, some discussion is warranted. One possibility is that in this applied setting, the behavior came under the control of extra-experimental reinforcement (Baer, Wolf, and Risley, 1968) or coincidental contingencies encountered en route (Skinner, 1969). An analysis of individual scores indicates that some students showed almost total absence of the target be-

haviors after the Game₁ phase, but for some there was a complete return to baseline. Thus, if the Skinner and Baer, *et al.,* accounts are tenable, only a portion of the subjects involved in the study came under the control of the coincidental contingencies.

An explanation of how the coincidental contingencies gained control is possible if we look at the classroom as a multi-operant situation like those constructed in the experimental setting by Findley (1962). In the present study, the classroom can be seen as a situation in which the students response options are limited. If the student were to receive the scheduled reinforcer, he had to emit a variety of responses compatible with the learning situation. With the emission of these responses, which at times included reading, some subjects could have gained an extra-experimental reinforcement history. Thus, the probability of more appropriate classroom behaviors rose above those target behaviors recorded. This explanation goes well beyond the data obtained in this study but is expressed in terms that allow for the application of behavior analysis.

During the study, no attempt was made to assess reading improvement because the project covered only the last 60 school days of the year and because a large portion of the sessions were held without the free-time and extra-recess contingencies. But a review of the teacher's plan book indicated that during and after the Game₁ phase, 25% more material was being covered as compared to pre-baseline and Baseline₁ conditions. It was felt that the design did help the teacher utilize the natural contingencies of reinforcement in the learning situation, which appeared to block most of the inappropriate classroom responses that were included within the behavior definitions of this experiment.

REFERENCES

Baer, D. M., Wolf, M. M., and Risley, T. R. Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis,* 1968, **1,** 91-97.

Barrish, H. H., Saunders, M., and Wolf, M. M. Good behavior game: effects of individual contingencies for group consequences on disruptive behavior in a classroom. *Journal of Applied Behavior Analysis,* 1969, **2,** 119-124.

Birnbrauer, J. S., Wolf, M. M., Kidder, J. D., and Tague, C. Classroom behavior of retarded pupils with token reinforcement. *Journal of Experimental Child Psychology,* 1965, **2,** 219-235.

Findley, J. D. An experimental outline for building and exploring multi-operant behavior repertories. *Journal of Experimental Analysis of Behavior,* 1962, **5,** 113-166.

Madsen, C. H., Jr., Becker, W. C., and Thomas, D. R. Rules, praise, and ignoring: elements of elementary classroom control. *Journal of Applied Behavior Analysis,* 1968, **1,** 139-150.

O'Leary, K. D., Becker, W. C., Evans, M. B., and Saudargas, R. A. A token reinforcement program in a public school: a replication and systematic analysis. *Journal of Applied Behavior Analysis,* 1969, **2,** 3-13.

Osborne, J. G. Free-time as a reinforcer in the management of classroom behavior. *Journal of Applied Behavior Analysis,* 1969, **2,** 113-118.

Schmidt, G. and Ulrich, R. Effects of group contingent events upon classroom noise. *Journal of Applied Behavior Analysis,* 1969, **2,** 171-179.

Schutte, R. C. and Hopkins, B. L. The effects of teacher attention on following instructions in a kindergarten class. *Journal of Applied Behavior Analysis,* 1970, **3,** 117-122.

Skinner, B. F. *Contingencies of reinforcement: a theoretical analysis,* Appleton-Century-Crofts, New York, 1969.

Surratt, P. R., Ulrich, R. E., and Hawkins, R. P. An elementary student as a behavioral engineer. *Journal of Applied Behavior Analysis,* 1969, **2,** 85-92.

Ulrich, R. and Stachnik, T. Educational implications of a science of human behavior. *Psychology,* 1965, **2,** 5-7.