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Dependent Group-Oriented Contingencies:A Synoptic Review

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Abstract

Dependent group-oriented contingencies (DGOC) are those in which the consequences for a group of students is dependent on the performance of one member or a small subsection of the group. There have been several reviews of group-oriented contingencies but none focusing solely on DGOCs to the exclusion of independent and interdependent types of group-oriented contingencies. Therefore, the purpose of the present review was to describe studies only using DGOCs to determine their feasibility and effectiveness for children and adolescents in school and school-related settings. Results indicated that DGOC can be used effectively, but methods need to be in place to minimize the risk of other students scapegoating and threatening the child for whom the contingency was implemented.

Keywords: low case, comma, paper template, abstract, keywords, introduction

1. Introduction

1.1 Introduce the Problem

Group-oriented contingencies make use, to varying degrees, peer pressure and involve the contingent presentation or loss of a reinforcer based on whether an individual student within a group, a portion of students within a group, or all the students in a group perform certain target behaviors to an established criterion (Cooper et al., 2007). Half a century ago, Litow and Pumroy (1975) coined the term *group-orientation contingency*. They eschewed the term “group contingency” because individuals within a group, and not the group itself, perform targeted behaviors. They went on to describe three types of group-oriented contingencies: independent, interdependent, and dependent that, to varying degrees, rely on peer pressure as a motivating operation for individuals to perform behaviors.

1.2 Types of Group-Oriented Contingencies

The independent group-oriented contingency arguably does not make use of any peer pressure because individual students who meet some performance criteria have access to a pre-determined

group reinforcer. The only aspect of this type of contingency that makes it "group" is that the same reinforcer is established for the entire group. A classic example of this type of contingency would be a teacher who gives students a spelling test on Monday and any students who receive 100% get to have free time during spelling lessons for the remainder of the week. The advantage of a independent group-oriented contingency is that no student is penalized for the poor performance or behavior of other students. Therefore, reinforcement is under individual students' control instead of being contingent on certain peers' performance (Maag, 2018).

Interdependent group-oriented contingencies require all students in a group to meet some predetermined criteria before any group member can receive reinforcement. The idea is for group members to work together to earn a reinforcer that they will share equally (Pappas et al., 2010). The most common application of an interdependent group-oriented contingency is the Good Behavior Game (GBG) developed by Barrish et al. (1969). The class was divided into two teams with the target behaviors being out of seat and talking-out. A tally mark was made on a poster board every time a student from either team was engaging in one of the target behaviors. The team with the fewest marks received a privilege. Almost all subsequent studies on the GBG used some variation of this procedure. The game operates on the principle of type 2 punishment—contingent withdrawal of a positive reinforcer (i.e., response cost). It could also be argued the game also operates on the principles of differential reinforcement of low (DRL) rates of behavior or differential reinforcement of other (DRO) behavior (i.e., reinforcing the absence of misbehavior). There is a variation of this game that is based on positive reinforcement called the Caught Being Good Game (CBGG) that focuses on increasing appropriate behaviors (e.g., Maag, 2019; Vidoni et al., 2014; Wahl et al., 2016).

The dependent group-oriented contingency (DGOC) is arguably the most controversial. It involves reinforcing a group of students based on the performance of one member or a small subsection of the total group (e.g., Maag, 2018). It has been called the "hero procedure" because it is hoped that peers will view the student who earned the class reinforcement as the hero. An early application of this contingency was implemented by Speltz et al. (1982) to improve accuracy of number of arithmetic problems solved on a worksheet in 10 minutes. One of four low-performing students was targeted and the number of correct answers written by the target student served as the basis for whether or not all group members received the reinforcer. The identity of the target student was known prior to the beginning of the 10 minute work period. This type of contingency does not target the behavior of group members but may be useful for reducing externalizing behaviors or increasing prosocial behaviors in a certain student within a classroom (Hansen & Lignugaris/Kraft, 2005).

1.3 Ethical Considerations

Cooper et al. (2007) raised certain ethical issues that need to be addressed to ensure that all types of group-oriented contingencies are practical, effective, and economical. These issues pertain primarily to interdependent and dependent configurations. They do not apply to independent group-oriented contingencies since they do not rely on any peer pressure. First, peers can place negative pressure in the form of threats or scapegoating on students who fail to improve. In terms of interdependent group-oriented contingencies there can be misleading

improvement of the group when targeting academic variables if the criterion for reinforcement is based on the average performance of a group. Both types of contingencies pose problems for students who are unable, or do not possess the requisite skills, to successfully complete the assigned task. There are also students who enjoy sabotaging the contingency. These students may find it more reinforcing to sabotage the contingency and the feeling of power/control and obtained negative attention than to receive the predetermined group reinforcer (Maag, 2018).

Romeo (1998) was particularly forceful about disadvantages of DGOCs. She noted that this contingency is fundamentally unfair to students and may produce group hostility or resentment toward the target student. Romeo also believed that group members could be punished for engaging in appropriate behaviors because they would lose the opportunity to receive the reinforcer based upon the actions of the target student. Conversely, a target student may feel scapegoated and, consequently, perceive the contingency as being punitive rather than being the "hero" that earned the group a reinforcer. However, Maag (2018) described a simple way to address these problems by keeping the name of the target student anonymous. For example, the performance of a student whose name is drawn from a bag determines whether the entire group obtains the established reinforcer. All students would have to try to obtain a score at the designated pre-determined criterion level because there is an equal chance that their names would be drawn. If the student's performance whose name is drawn does not reach the criterion, the teacher simply tells the class they did not earn the reinforcer today without revealing that student's name. However, if the student's performance reaches the criterion, the teacher can announce their name so the class knows the student is the "hero" that earned them all the reward.

1.4 Previous Reviews

The Good Behavior Game (GBG), an interdependent contingency, is the most frequently reviewed out of the three types. Tingstrom et al. (2006) reviewed the literature from 1969 through 2002 and described its variations and adaptations as well as target behaviors and participants. Nolan et al. (2014) conducted a literature review of the GBG across cultures, diverse populations, and countries. They found the GBG to be effective by researchers conducting studies in Germany, United Kingdom, Netherlands, Spain, Australia, and Sudan. There have also been two systematic reviews of the GBG (Bowman-Perrott et al., 2016; Flower et al., 2014).

There have also been three previous reviews that have focused on different types of group-oriented contingencies. Litow and Pumroy (1975) conducted a brief review of independent and interdependent group-oriented contingencies and concluded that the interdependent arrangement was more effective than the independent approach. Almost three decades later, Theodore et al. (2003) conducted another review and concluded that there was no compelling evidence that one of the three types of group contingencies was superior to the other. Skinner et al. (2004) reviewed related literature to illustrate how interdependent group-oriented contingencies with randomly selected indiscriminable or unknown contingencies can be used to improve students' academic performance.

Two meta-analytic reviews have been conducted focusing on certain aspects of group-oriented contingencies. For example, Stage and Quiroz (1997) reviewed 99 studies of 16 different types of interventions to decrease disruptive behavior in classroom settings and concluded that group-oriented contingencies, in general, yielded the largest effect sizes of any of the interventions reviewed. However, the number and type of group-oriented contingency studies were not reported. Finally, Little et al. (2015) conducted a meta-analysis of the three types of group-oriented contingencies. There were a total of 50 studies reviewed, six of which focused solely on dependent group-oriented contingencies while five other studies compared dependent group-oriented contingencies to various combinations of the other two types of contingencies.

1.5 Purpose of the Present Review

From the reviews described previously, there have been none that focused solely on dependent group-oriented contingencies. Previous researchers have either hypothetically considered them the least effective because they are not focusing on the behavior of an entire group (Litow & Pumroy, 1975) or they are too dangerous to use because of the potential for scapegoating, hostility, and resentment toward the target student (Romeo, 1998). However, they have the potential for being an extremely powerful technique for improving various types of behaviors of target students if implemented correctly (Maag, 2018). Therefore, the purpose of the present review is to describe in a synoptic way the effectiveness of DGOCs in terms of implementation procedures, dependent measures, and obtained results.

2. Method

A systematic search was performed to identify the extent research regarding the use of dependent group-oriented contingencies. The search methods were consistent with the 12-item PRISMA statement for reporting meta-analyses (Liberati et al., 2009). Academic Search Premier was the search source with the following selected databases: ERIC, PsycARTICLES, and PsycINFO. The following Boolean terms/phrases were used: (“dependent group oriented contingencies”) OR (“dependent contingency”) OR (“hero procedure” AND (“children”) OR (“adolescents”) OR (“youth”) OR (“child”) OR (“teenagers”) OR (“students”) OR (“students with disabilities”). In addition, ancestral searches were conducted of four journals that publish exclusively or primarily behavioral intervention research: *Journal of Applied Behavior Analysis*, *Journal of Behavioral Education*, *Journal of Positive Behavior Interventions*, and *Behavioral Disorders*.

2.1 Eligibility Criteria and Study Selection

Studies included both single case research and group designs as well as case studies. Studies had to be in English and published in peer-reviewed journals between January 1, 2005 and December 30, 2024. Participants considered in the present review were students in K-12 settings whose behavioral issues required intervention. Specifically, DGOCs (e.g., “hero procedure”) that were used either to improve the appropriate behaviors of individual students or a small group (e.g., three to five) of students. Both academic and social behaviors were considered to be increased and included in the present descriptive review. Studies that

compared dependent group-oriented to other types of group-oriented or individual contingencies were omitted. The reason was to maintain the integrity of only including studies using a DGOC in isolation as to avoid any carryover effects or treatment interference from a second intervention being implemented.

Studies were identified and retained at different stages based on PRISMA guidelines. There were 25 total records identified. After removing dissertations, textbooks, and book chapters, there were 18 studies of which titles and abstracts were read. Of those, 11 were read in their entirety (i.e., method sections for inclusion/exclusion criteria). One doctoral student was trained by the researcher how to read each of the 11 studies' method sections. After engaging in the flow of information process, there were six articles retained for the current review.

2.2 Coding Procedures

The six articles retained from the search were coded along six variables: (a) participant characteristics, (b) diagnosis/educational label, (c) settings, (d) type of design, (e) dependent variables, and (f) type of dependent group oriented contingency (e.g., on student or small groups of 3 to 5 students). One of the experienter's doctoral students was trained by the experimenter to code the six variables. Two studies were randomly selected and the experimenter demonstrated the coding process through instructions and modeling. The doctoral student then coded the remaining three studies with the experimenter providing performance feedback.

2.3 Publication Bias

Publication bias, or the "file drawer" effect refers to presence of potential bias existing because of a greater likelihood that published research shows positive findings (Rosenthal, 1979). In a meta-analysis of group design studies, the Meta-Win's Fail-Safe function (Rosenberg et al., 2000) can be used to estimate the number of studies with null results sufficient to reduce observed effect size to a minimal level (i.e., < .20). However, given the small number of studies reviewed (n=6), publication bias could not be addressed. Further, the goal was to obtain only studies published in peer reviewed journals to ensure experimental rigor that is often lacking in dissertations or those appearing in chapters of edited books. The lack of addressing publication bias is a limitation of the current review.

3. Results

Results are presented in three sections. The goal is to synthesize (i.e., aggregate) data from all six included studies. However, any data anomalies were addressed specific to individual studies. The first section addressed participants and setting characteristics. The second section focused on the type of experimental design used and the dependent measures employed to determine the DGOCs effectiveness. Finally, the actual dependent group-oriented contingencies are described, compared, and contrasted across studies.

Table 1. presents a summary of each of the extracted variables.

Study	Participants	Setting	Experimental Design	Dependent Variables	Type of DGOC
1. Cariveau & Kodak (2017)	3 female and 5 male 2nd grade students	General education classroom	Single case reversal design	Academic engagement	Randomized dependent group contingency
2. Deshais et al. (2018)	1 male and 1 female 1st grade students	General education classroom	Multiple baseline design across transitions	Disruptive behaviors	Randomized dependent group contingency
3. Hansen & Lignugaris/Kraft (2005)	9 males (7th – 9th grade), 11-16 years of age	Self-contained special education classroom	Single case reversal design	Positive & negative verbal statements	Randomized dependent group contingency
4. Heering & Wilder (2006)	31 3rd graders & 33 4th graders, ages 9-11	Private school classroom	Multiple baseline across classrooms	On-task behaviors	Dependent group contingency
5. Vidoni & Ward (2006)	1 male & 1 female 6th grade students	Middle school physical education classes	Multiple baseline across classes	Supportive behaviors	Dependent group contingency
6. Williamson et al. (2009)	5 male & 1 female 10th graders	English class in special education resource room	Single case reversal design	On task behaviors	Randomized dependent group contingency

3.1 Characteristics of Participants and Settings

A total of 91 participants were included in the six studies contained in this analysis. This number, however, is misleading because one study (Heering & Wilder, 2006) did not target any particular students within a group or classroom. Rather, students from one classroom of third graders and another class of fourth graders (n = 64) participated in the DGOC. The gender of these 64 participants was not addressed. Participant characteristics from the other five studies (n = 27) provided more detail. Specifically, there were six females and 21males ranging from grades one through 10. Age was provided for participants in two studies ranging from nine to 16 years old (Hansen & Linugaris/Kraft, 2005; Heering & Wilder, 2006). Participants in one study were identified as having an emotional disturbance (Hansen & Linugaris/Kraft, 2005) while another (Williamson et al., 2009) had three participants identified as learning disabled, one as ADHD, and another as emotionally disturbed. The remaining four studies indicated participants were nominated by their respective teachers for displaying severe challenging behaviors.

There were a variety of settings in which the six studies were conducted. Two studies only indicated the setting was a general education classroom (Cariveau & Kodak, 2017; Deshais et al., 2018) while another two studies described the specific content in which the DGOC was

implemented: physical education and English, respectively (Vidoni & Ward, 2006; Williamson et al., 2009). Finally, two studies were conducted in special education classrooms—one in a self-contained classroom (Hansen & Linugaris/Kraft, 2005) and the other in a resource room (Williamson et al., 2009).

3.2 Experimental Design and Dependent Measures

All six studies used single case research designs (SCRDs). Three studies used a reversal design (i.e., ABAB) while the other three employed multiple baseline designs. Two of the multiple baseline designs were across classrooms (Heering & Wilder, 2006; Vidoni & Ward, 2006) while a third was across transitions (Deshais et al., 2018).

Dependent variables all targeted specific behaviors including academic engagement, disruptive behavior, positive and negative verbal statements, supportive behaviors, and on-task. Each study specifically operationally defined each of those behavioral categories. For example, Cariveau and Kodak (2017) defined academic engagement as participants engaging in appropriate verbalizations, remain seated, and appropriate looking at the teacher or peers while Deshais et al. (2018) defined disruptive behaviors as talking without permission and touching others.

3.3 Type of Dependent Group-Oriented Contingency

Four studies used randomized dependent group contingencies. In this arrangement the teacher would tell the class that during the activity or lesson a container held pieces of paper with each student's names written on them. After the session was over the teacher would pull a student's name at random from the container. If that student met the predetermined criterion, then the teacher announced the student's name so that peers could clap and cheer for him or her earning them all a reinforcer. However, if the student whose name was selected did not meet the criterion, the teacher would simply say the class did not earn the reinforcer but will get a chance to try again later without stating whose name was selected. The procedure for two studies was to only have the teacher pull one student's name (Cariveau & Kodak, 2017; Williamson et al., 2009). In another study the teacher would randomly pull the names of two students, both of whom must meet the predetermined criterion in order for the entire class to receive the reinforcer (Hansen & Linugaris/Kraft, 2005). Finally, Deshais et al. (2018) had the teacher divide the class into two groups—one with boys and the other with girls. One name was pulled for each of the two groups. If the two students, one from each group, met the criterion then both groups would receive the reinforcer. The teacher also told students that if only one name pulled met the criterion, then that person earned their team a reinforcer. For example, if one mystery student met criteria the teacher would say "The girls' team should give a cheer and clap for Meagan because she followed the rules and earned all of you a treat."

The two remaining studies who indicated they used a "dependent group contingency" which were variations of the randomized approach used by the previously described four studies. For example, Heering and Wilder (2006) randomly selected a row of students during a class-wide math period and if the entire row met a predetermined criterion, then everyone

received a group reinforcer. Finally, Vidoni and Ward (2006), had two teams playing volleyball. Each team member's names were placed in two rows. The teacher selected a name from each row and if that member met criteria, the team won a prize. However, it was unclear whether or not the teacher knew the name of the student selected from each team in advance or if the process was randomized.

4. Discussion

The purpose of this synoptic review was to present a general outlook of studies focusing solely on some type of dependent group-oriented contingency. Most of the studies used a randomized version of this intervention in which neither the teacher nor classmates knew the name of the student on whose performance would grant or deny the group a reinforcer. In some studies only one student's name was anonymously and randomly selected while in others two or more students were selected and in one study an entire row of students was selected (Vidoni & Ward, 2006). In this case it is likely, but not specified, that the teacher who selected the row also knew those students' names and, consequently, the intervention was not randomized. Nevertheless, results indicated that all study participants improved on the targeted, operationally defined behaviors. However, visual inspection of the studies' graphs revealed all had some degree of overlapping data from baseline to intervention with three studies having the least amount (Heering & Wilder, 2006; Vidoni & Ward, 2006; Williamson et al., 2009). Nonoverlapping data from baseline to intervention is important for interpreting the impact of change. One way of demonstrating experimental control and treatment effects are graphs depicting minimal to no intervention data overlapping with baseline (Maag, 2022).

There are several procedures that can help improve the effectiveness of dependent group-oriented contingencies that may result in cleaner trends in graphed data. There are also limitations to the present review that require discussion and elaboration along with areas for future research. Finally, implications for practitioners using DGOC interventions are presented.

4.1 Improving Effectiveness of Dependent Group Contingencies

One of the problems using dependent group-oriented contingencies is that students can easily figure out the odds of whether or not their name is going to be pulled to determine if they earned the entire class a reinforcer which may, in turn, reduce certain students' desire to meet a predetermined criterion. For example, Heering and Wilder (2006) had 31 and 33 students each, respectively, in a third and fourth grade classroom. It is easy to imagine some students can figure out there is a low likelihood of their names being drawn with so many students to select and, consequently, find the risk of not performing as hard acceptable. However, to combat this potential problem, students were told that an entire row would be selected and each member in that row had to reach criteria. This condition greatly reduced the odds of someone's name not being selected. This study is illustrative of how even with an entire class of students it is possible to improve the performance of all students when the potential for being selected is high. Therefore, teachers can improve the use of DGOCs by using smaller groups of students rather than only one or two students' performance to earn the entire class a

reinforcer.

Another way to improve the use of DGOCs is for a teacher to ensure they have conducted activities and developed enough rapport with students that fosters a classroom environment of cooperation and acceptance for all. This suggestion is easier to attain when teaching younger elementary-age students such as those in kindergarten through second grade because the teacher has the same students for most, if not all, of the day. Further, adults who teach in lower elementary age classes typically use group activities and manipulatives for teaching a wide variety of skills including, but not limited to, math, spelling, and non-academic content such as nurturing social skills such as cooperation, helping others, being polite, and considerate of others (e.g., Bassachs et al., 2020; Battistich & Watson, 2003; Gillies, 2003; Stevens & Slavin, 1995).

A final way to improve the effectiveness of DGOCs is to initially use them during activities for which the teacher knows all students possess the skills for reaching a predetermined criterion. The game does not need to be a big production and may only last 10 minutes. This way, a teacher can implement the DGOC multiple times during the course of daily activities including games students play during recess (e.g., Vidoni & Ward, 2006). The more students acclimate to having multiple short "games" of DGOCs, the more they may begin to encourage their peers to do well, thus fostering positive peer pressure and interactions (Maag, 2018). It also helps to have activities in which students can suggest certain prizes or activities to serve as reinforcers. The more teachers can involve students in the contingency, the more students are likely to respond positively to the activity and their peers (Johnson, 2008).

4.2 Limitations to the Present Review and Areas for Future Research

An obvious limitation to the current review was the dearth of obtained studies. Six studies is a small number for a review of the literature. However, in a thoughtful paper on the topic of how many studies do you need for a systematic review, Valentine et al. (2010) concluded that two studies are sufficient when conducting a meta-analysis. Their conclusion may initially seem absurd, but they asserted computing confidence intervals in addition to a power analysis can convey just as much information as reviews with more studies. In terms of reviews that do not use quantitative analysis, they recommended, regardless of the number of studies, that authors should provide suggestions for both highlighting the current limitations in the research and limiting the number of studies that display the characteristics and results that met whatever criteria was set for inclusion in the review. Therefore, it appears that the "quality" rather than "quantity" of studies reviewed is key to a meaningful analysis.

Another limitation was that no effect sizes were calculated. However, there is still debate concerning the importance, or relevance, of calculating effect sizes for single case research designs (Maag, 2022). For example, there are three groups of effect size calculations for SCRD studies: within- and between-case parametric measures and nonoverlap methods (Dowdy et al., 2021). Both parametric methods would include, for example, calculations such as standard mean difference (SMD)—the group design equivalence of Cohen's *d*. However, the problem with SMD calculations is that they severely overinflate effect sizes. A disadvantage of using nonoverlap effect sizes is that, although they provide an indicator

whether or not an intervention was effective, they do not convey the enormity of change (Maag, 2022). In the present review with only six studies, the most common form of analysis is visual inspection of graphs in which trend, variability, and level of change determines the effectiveness and magnitude of an intervention (Kazdin, 2011).

In terms of future research, variations of DGOCs need additional clarification and the ability to answer several questions. First, how to deal with students being less motivated to perform well if they know a large number of students, such as an entire class, will be involved in the contingency. Heering and Wilder (2006) addressed this concern by selecting an entire row of students that had to meet a predetermined criterion before the class would receive a reinforcer. Research should explore just what the limits are of how many students could form a small group to determine if everyone receives reinforcement. For example, given a class of 30 students, would five, 10, or 15 students need to be grouped to reduce the likelihood of certain students opting out of reaching criteria if there is a low probability their name(s) would be drawn. Another area for future research would be to empirically determine whether DGOCs work better with younger children such as those in elementary school versus high schoolers. The assumption is elementary school teachers have more control and knowledge of their students than a secondary math teacher who may have five or six different sections of a course and only see any one set of students for one hour a day. Yet, this assumption has never been empirically tested.

4.3 Implications for Practice

As stated previously, DGOCs have been criticized for being unfair to certain students who met criteria but did not receive reinforcement thus resulting in hostility or resentment toward target students (Romeo, 1998). However, this observation was made over 25 years ago and can be mitigated when teachers implement DGOCs with that knowledge in hand. To that end, there are several implications for practitioners who wish to use dependent group contingencies.

First, if DGOCs are being used during an academic activity such as independent practice, teachers need to ensure all students possess the requisite skills for completing assigned work. Reinforcement, regardless of how it is delivered, is a motivational strategy for students who possess requisite skills but choose not to use them. Put another way, reinforcement does not teach students, teachers teach students. Therefore, teachers need to be mindful of whether certain students have a skill deficit which requires academic remediation or a performance deficit which requires motivational strategies. Second, teachers should initially select a lesson or activity students find enjoyable as a means to not only set up students for success, but also for them to learn the appropriate behaviors required to participate in this type of group-oriented contingency. Third, and related to the second recommendation, initial sessions should be short to minimize students losing interest and, consequently, motivation to reach criteria. Finally, it may be helpful for teachers to begin using an independent group-oriented contingency in which only students who met criteria receive reinforcement regardless of their peers' performance. Once this type of contingency has been in place for a period of time, teachers can then move toward DGOCs to capitalize on positive peer pressure—the latter of

which requires a teaching environment in which all students are valued by each other, find helping peers fulfilling, and enjoy cooperating with others.

4.4 Conclusion

All three types of group-oriented contingencies—independent, interdependent, and dependent all have their strengths and weaknesses. Independent contingencies do not penalize students who reach criteria but would not otherwise earn a reinforcer because of poorer performance of certain peers. Yet, they do not have the advantage of fostering and reinforcing group cooperation. Interdependent contingencies in which everyone must reach criteria before anyone obtains reinforcement can easily be sabotaged by individual students who enjoy receiving negative peer attention which can be very positively reinforcing—negative attention is better than no attention at all. Dependent contingencies remove this potential problem by limiting the number of students whose performance may earn the entire class reinforcement.

The bottom line is that group-oriented contingencies, regardless of which variation, are simply reinforcement delivery systems, just as are token economies, behavioral contracts, and level systems, to name but a few (Maag, 2024). The important point, regardless of the delivery system, is that teachers obtain rewards, trinkets, or privileges that students truly find reinforcing. It is not enough for teachers to assume what all students would find reinforcing. Rather, it is up to the teacher to observe students when they have free access to activities and privileges to determine which ones all students may find motivating. Delivering reinforcement is not only effective but done correctly can become an exciting game for whom all students want to participate.

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