Differential Reinforcement procedures for Access & Escape Functions

Differential reinforcement procedures are primary tools for teachers in addressing problem behaviors. In using differential reinforcement, the behavior selected for the contingency increases in probability while the behaviors that do not result in the reinforcer undergo extinction. Differential reinforcement programs can provide either access to a positive reinforcer contingent upon a selected behavior or an escape contingency for a selected behavior from a negative reinforcer. We refer to the former as differential positive reinforcement and the latter as differential negative reinforcement procedures. Differential positive reinforcement procedures apply when the MO is a deprivation state and differential negative reinforcement procedures, when the MO is an aversive condition.

There are a variety of differential reinforcement procedures that can decrease target problem behavior. To reiterate, non-reinforced behavior decreases in probability as a result of the programming of extinction, e.g., removal of positive reinforcer for its occurrence. Some produce reinforcement for a specific, appropriate behavior (DRA) while some produce reinforcement for the absence of an undesirable target behavior (DRO). Others produce reinforcement for a certain rate of acceptable
behavior (DRH) while others produce reinforcement for a certain low rate of target behavior (DRL). Teachers can use these differential reinforcement procedures in both positive and negative reinforcement operations.

**DIFFERENTIAL POSITIVE REINFORCEMENT**

**DIFFERENTIAL REINFORCEMENT OF OTHER BEHAVIOR (DRO)**

**Brief description.** The DRO schedule provides a reinforcer for a student abstaining from performing a target behavior, i.e., the absence of the problem behavior produces a reinforcer. The DRO decreases the rate of a problem behavior by providing a contingent reinforcer for the absence of the target behavior within a designated time interval. The DRO works well when a teacher primarily wants to reduce a target behavior rather than increase a particular behavior.

The designated time interval is called the DRO interval. The absence of the target behavior produces reinforcement whereas the occurrence of the target behavior postpones reinforcement for the length of the DRO interval. Therefore, many behaviors can occur in the DRO interval while subsequently providing the positive reinforcer. However, if the target behavior occurs, the teacher withholds
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reinforcement, i.e., extinction is programmed. With the occurrence of the target behavior, the DRO interval is reset.

**Procedures for DRO.** Teachers should use the following procedures in setting up a DRO program:

(1) Identify target problem behavior(s) for decrease.

(2) Identify positive reinforcer to be delivered

(3) Collect baseline data on the frequency of this behavior within the designated class period prior to implementing the DRO program (see section on establishing DRO interval length below)

(4) Identify the initial behavioral standard for reinforcement (DRO interval) based on obtained baseline data, e.g., five-minute DRO interval.

(5) If the child refrains from engaging in the target behavior for the DRO interval length as marked by a timing mechanism, provide the reinforcer if using a Premack contingency involving an activity, or provide a generalized conditioned reinforcer (such as points if appropriate).

(6) If the child engages in the target behavior, provide immediate feedback with respect to the occurrence of the behavior and reset the timer for the full DRO interval.
(5) Evaluate the effectiveness of the DRO program to produce a reliable rate of achievement of the behavioral standard across several weeks of implementation. Calculate the percentage of intervals achieving standard across the number possible.

(6) If you achieve success in reaching the initial criterion, progressively increase the DRO interval for the next several weeks.

(7) Continue progressive changes in the DRO interval length (behavioral standard) across time until the child achieves the desired level of the appropriate behavior without exhibiting the target behavior for long periods of time.

How long should the DRO interval be? The initial interval length for the DRO is not arbitrarily determined at some value you may perceive as fair, e.g., 25 minutes. An arbitrary decision can often lead to program failure. The DRO interval should be set as a function of the baseline data. The baseline data collected should allow you to determine the average interval of nonoccurrence of the target behavior. One can achieve this simply by dividing the length of the data collection session by the frequency of target behavior. The chart below provides this analysis for six days of data collection during one class period (Table 1).
### Table 1: Six Sessions of Data

<table>
<thead>
<tr>
<th>Date</th>
<th>Frequency of target behavior</th>
<th>Duration of data session (in minutes)</th>
<th>Average nonoccurrence interval length (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-10</td>
<td>6</td>
<td>60</td>
<td>10</td>
</tr>
<tr>
<td>11-11</td>
<td>10</td>
<td>48</td>
<td>4.8</td>
</tr>
<tr>
<td>11-12</td>
<td>10</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>11-13</td>
<td>5</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>11-14</td>
<td>10</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>11-17</td>
<td>2</td>
<td>40</td>
<td>20</td>
</tr>
</tbody>
</table>

One can see in the last column that the average nonoccurrence interval ranged from a low of five minutes in two sessions to a high of 20 minutes (best session on 11-17). In the best session, the target behavior is only occurring about once every 20 minutes. On the days that the target behavior occurred more frequently, it was occurring about once every five minutes (average).

Selecting a reasonable DRO interval involves analyzing the baseline data. For example, with this hypothetical student, selecting a DRO interval of more than 20 minutes would probably result in that student not earning the desired reinforcer very often (or not at all). Hence, this then forces the student to go back to the target behavior to access reinforcement or some other behavior that is equally unacceptable. In contrast, setting the DRO interval at one minute would be comparatively easy for Ennio Cipani, Ph.D. for use with text Functional behavioral assessment, diagnosis, and treatment with author’s permission
this student. Setting it at the average nonoccurrence interval length for these six sessions would be reasonable. The average nonoccurrence interval for these baseline sessions is calculated by adding all the averages for each session (i.e., numbers in last column) and dividing by six. The average nonoccurrence interval for these baseline data is 9.1 minutes or nine minutes for the DRO interval. Selecting that as the initial DRO behavioral standard would lead to a reasonable level of reinforcements in the early part of the program.

Just as we determine the initial length of the DRO interval by baseline data, so too do we with decisions about altering the DRO interval length as the program proceeds. As we achieve success with the initial DRO interval, we gradually increase the subsequent length of the DRO interval. By progressively altering the DRO interval length over time, even lower rates of the target problem behavior are achieved. The DRO schedule, therefore, works well for reducing a high rate problem behavior over time.

**Hypothetical example: Verbal outbursts and tantrums.** Berta has difficulty keeping her verbal outbursts and inappropriate language to a reasonable level and form. Such behaviors are often in response to teacher corrections of her work. During a six-day baseline period in an eighth grade math class, she had between two and six
verbal outbursts or inappropriate language in the 40-minute period. This translates to an average occurrence of a target behavior about every ten minutes.

The teacher has decided to initiate a DRO program with a DRO interval of ten minutes. For every DRO interval, she refrains from such target behaviors, and he gets five points toward a special activity on Friday with a friend during afternoon recess. Each point is worth one minute. In addition, the teacher prompts her to ask for help when she sees Berta needs help. If Berta asks for help appropriately, the teacher gives her a maximum of two points for requesting help, instead of engaging in inappropriate language. The first two weeks of the plan resulted in a 25 percent reduction in the target behavior. Once she is successful for three consecutive weeks with this criterion, the teacher can increase the DRO interval to 14 minutes with two points being awarded. Following three weeks of success, the teacher changes the DRO interval to 20 minutes. The teacher will continue to alter progressively the DRO interval length until the child is having no verbal outbursts per week for at least a three-week period.

**Comprehension question check:**

1) Can a DRO program be designed if the baseline data indicate only the rate of behavior? Why not? What additional piece of information do we need?

2) Why is it important to collect baseline data when considering a DRO?
3) A student demonstrates ten occurrences of the target behavior within a 60-minute math period. What is the average length of time that elapses between target behaviors? How do these data help in setting the DRO interval?

4) Explain how the DRO program decreases the target behavior.

5) What happens to Berta when she engages in a verbal outburst five minutes into the DRO interval (hint look at procedures section if you are unsure)?

6) Why do you think that the teacher imposed a four-fine limit on Roger? Have you seen children who “go berserk” when fined (i.e., response cost) and lose all of their points?

**DIFFERENTIAL REINFORCEMENT OF HIGH RATE BEHAVIOR (DRH)**

**Brief description.** The DRH is a differential reinforcement program that progressively increases the rate of a desired behavior. It accomplishes this by providing a contingent reinforcer when the student performs the desired behavior at or above a certain frequency level in a designated period. The DRH schedule provides a reinforcer for performing a behavior at a minimal level of occurrences, and withdraws that reinforcer for not reaching that level.

The DRH is effective when an existing appropriate behavior is occurring, but not at a reasonable level. For example, a student who finishes six of ten problems during an assignment has demonstrated that he can perform the task. However, the rate at which he performs class work is not at adequate levels for his sixth grade
mainstream class. Perhaps he disengages frequently, thus reducing his output during this activity. The teacher needs to increase his performance to a level of completion similar to other students, about 25 to 30 problems in the same period. The use of a DRH program in this case might start with a criterion level of completing at least eight to ten problems (depending on difficulty) as the initial DRH schedule. The student receives reinforcements if he finishes at least ten problems out of the total number. Of course, he can complete more than ten and receive reinforcement. However, not completing this minimal amount, at least ten, does not result in the reinforcer. The differential aspect of the DRH is that reinforcement occurs only above a certain rate of behavior but not below that rate.

The teacher should set the initial DRH schedule to facilitate success. When the level of behavior matches or exceeds the designated criterion level repeatedly, the teacher can set a higher standard. This allows the teacher to increase gradually the rate of acceptable behavior.

**Procedures for DRH.** Clinician or teacher should use the following procedures in setting up a DRH program:

(1) Identify target (appropriate) behavior(s) that you desire to increase in frequency.

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(2) Identify positive reinforcer to be delivered.

(3) Collect baseline data on the frequency of this behavior within the designated period prior to implementing the DRH program.

(4) Identify the initial behavioral standard for reinforcement (high rate of behavior) based on obtained baseline data (rate of behavior) e.g., five occurrences or more as the response criteria needed for reinforcement.

(5) If the child achieves the behavioral standard by reaching or exceeding the minimal rate of the appropriate target behavior, provide the reinforcer. If the child does not reach the behavioral standard, do not deliver reinforcement.

(5) Evaluate the effectiveness of the DRH program to produce a reliable rate of success in achieving the behavioral standard across several weeks of implementation.

(6) If the child achieves success in reaching the initial criterion, progressively increase the behavioral standard for reinforcement for the next several weeks.

(7) Continue progressive changes in the behavioral standard across time until the child achieves the desired level of the appropriate behavior.

**How do you determine the behavioral standard for the DRH?** The behavioral standard for the DRH is not arbitrarily determined at some value you may perceive as fair, e.g., 21 or more occurrences of the target behavior per day. While over 20
occurrences of the behavior may be the target goal, it may not be a reasonable start point. The initial value selected as the behavioral standard needs to be a function of the collected baseline data. The baseline data collected allows the user to determine the average frequency of occurrence of the desired appropriate behavior given the absence of systematic reinforcement. The chart below provides frequency data for six baseline sessions with the time period being the entire day (Table 2).
One can see that the frequency of the desired behavior ranged from a low of one occurrence in two sessions to a high of six (best session on 11-10). Selecting a reasonable behavioral standard involves analyzing these baseline data. For example, selecting a behavioral standard for the initial DRH of ten or more would probably result in the student’s not earning the desired reinforcer very often (or not at all). Hence, the client must go back to the target behavior to access reinforcement or some other behavior that is equally unacceptable. Setting a DRH of one appropriate behavior would be comparatively easy. Setting it at the average frequency across these six sessions would be reasonable, which would be three occurrences. This would require the student to engage in the target-desired or desirable target behavior at least three times on any given day to earn reinforcement.
Just as the initial behavioral standard was determined by baseline data, so, too, are decisions about altering the behavioral standard for the DRH as the program proceeds over time. As the child achieves success with the initial behavioral standard, the teacher can gradually increase the behavioral standard over time. By altering the behavioral standard progressively, the student can generate an even higher rate of the acceptable target behavior as the student moves closer to the final target goal.

**Hypothetical example: Following teacher directions.** Raul is an academically capable young elementary grade level child with mild disabilities. He attends school in both a special and general education setting. He has difficulty following teacher directions during activity transitions in his mainstream class, but it is important for students mainstreaming in general education to comply with directives from the general education teacher. Failure to do so can seriously hinder their current and future attempts at receiving instruction in mainstream settings. To develop Raul’s capability, his special education teacher considers setting up a DRH program targeting compliance to teacher directives during transition periods in the mainstream class.

The mainstream aide is told to collect baseline data on Raul’s percentage of compliance with the third grade teacher’s instructions and requests for a two-week period. She records the number of times Raul complies with an initial request (clean
off your desk before getting in line, come to the reading table, etc.) versus the number of times he does not comply. When he does not comply, she prompts Raul to comply with the transition but does not score it as compliance. The goal is to get him to comply with the third grade teacher’s directives and, therefore, become less reliant on the mainstream aide for directives.

Raul’s daily percentage of compliance with the third grade teacher’s requests ranged from 45-90 percent with an average of 70 percent across the baseline period. A DRH program was then set up that identified the criterion level of 70 percent. If the percentage of compliance was above 70 percent for that day, Raul got a special activity for ten minutes when he returned to the SDC class. If he failed to reach this level, he received no special activity that day and went to class work immediately. As a further incentive, if Raul reached four out of five days earning the special activity that week, he received a special Friday activity at home with the cooperation of his parents. As Raul becomes successful with this 70 percent criterion level, it will be increased progressively until it reaches an acceptable 90-100 percent level of compliance across three weeks. The DRH program will then be gradually faded as a function of his performance.

**Comprehension question check:**

1) Explain how you would collect baseline data when considering a DRH program.
2) Which behavior program would you use if you wanted to increase a student’s participation in a mainstream physical education class (e.g., increasing the number of times he engages in a requested activity from the PE teacher)?

3) How does a DRH increase the target behavior? Why does the teacher progressively alter the standard over time? Explain your answer by invoking the concept of ratio strain from Chapter 3.

**DIFFERENTIAL REINFORCEMENT OF LOW RATE BEHAVIOR (DRL)**

_Brief Description._ The DRL involves a criterion level for reinforcement that is set at some designated low rate (or level) of the target problem behavior(s). Reinforcement is delivered if the level of behavior falls at or below the designated criterion level for the designated period (e.g., hour, half day, day, etc.). If the rate of the behavior across the designated period goes above the maximum level, then the teacher does not deliver reinforcement. Students who exhibit a problem behavior at high levels can benefit from a DRL program due to its progressive alterations of the behavioral standard for reinforcement. This program merely requires a rearrangement of contingencies that progressively decrease the level of target problem behavior.

Let’s say a teacher has a child in her junior high special day class who blurts out comments during independent seatwork over ten times a day. Due to the current high level of target behavior, a criterion of zero occurrences would probably not result in frequent reinforcement for this child. That program would not even get “off the
ground.” If a zero rate criterion is set, the delivery of the reinforcer will be infrequent at best and nonexistent at worst. Such a schedule of reinforcement will not allow the teacher to begin changing this behavior. In contrast, the teacher sets a more reasonable initial goal, e.g., ten or fewer occurrences of blurting-out comments for a day. If the student reaches that goal, he or she earns a daily reinforcer. With success, the teacher can lower the DRL behavioral standard, perhaps to seven or fewer after two weeks of success with the initial criterion of ten or fewer.

**Procedures for DRL.** The teacher should use the following procedures in setting up a DRL program:

1. Identify target problem behaviors for decrease.
2. Identify positive reinforcer to deliver.
3. Collect baseline data on the frequency of this problem behavior within the designated period prior to implementing the DRL program.
4. Identify the initial behavioral standard for reinforcement (low rate of behavior) based on obtained baseline data (rate of behavior) e.g., eight occurrences or fewer as the response criteria needed for reinforcement.
5. If the child achieves the behavioral standard by not exceeding the maximum rate of the target problem behavior, provide the
reinforcer. If the child does not reach the behavioral standard, do not deliver reinforcement.

(5) Evaluate the effectiveness of the DRL program to produce a reliable rate of achievement of the behavioral standard across several weeks of implementation

(6) If the child achieves success in reaching the initial criterion, progressively decrease the behavioral standard for reinforcement for the next several weeks.

(7) Continue progressive changes in the behavioral standard across time until the child achieves the desired level of behavior.

**How do you determine the behavioral standard for the DRL?** The behavioral standard for the DRL is not arbitrarily determined at some value you may perceive as fair, e.g., one occurrence as the requirement for reinforcement. While that may be the desired target goal, it would produce ratio strain (see Chapter 3) for students whose current level is far in excess of that value. The initial value selected as the behavioral standard for the DRL needs to be a function of the collected baseline data. The baseline data collected should allow the user to determine the current average frequency of occurrence of the behavior given the absence of systematic reinforcement. The chart below provides this frequency data for six baseline sessions with the period being the entire day (Table 3).
One can see that the frequency of the undesirable target behavior ranged from a low of one occurrence in two sessions to a high of six (worst session on 11-10). Selecting a reasonable behavioral standard involves analyzing the baseline data. For example, selecting an initial behavioral standard of zero might result in low rates of reinforcement, hence ratio strain. Setting a DRL of six or less would be comparatively easy. Setting it at the average frequency across these six sessions would be reasonable, which would be three occurrences. This would require the student not to exceed three occurrences of the target behavior on any given day to earn reinforcement.

**Hypothetical example: Loud talking.** Johnny often talks very loud during group projects. The volume of his voice is such that the teacher often has to request that he use his “inside” voice, but to no avail. While there are times when he seems
unaware that he is disruptive to other groups of students in the class, he needs to learn to lower his voice to an acceptable level.

Johnny’s teacher implements a self-monitoring system for his loud talking during group activities by designing a card that has the numbers one to six marked on it. Each time Johnny engages in loud talking, he marks a consecutive number on the card. He learns how to monitor this behavior during several training days. He keeps a daily record sheet that requires him to place marks on the respective date when he talks too loud. The behavioral standard for this DRL program was established by baseline data taken for seven sessions. The baseline data indicated an average rate of four incidents per day. Therefore, if Johnny marks four or less per period he earns three stars. If he goes above five occurrences before the end of the school day, he does not get three stars. He can trade in all his earned stars at the end of the week for time with the instructional assistant, playing a computer game with her. Each star translates to one minute of time. The teacher spot checks Johnny’s recording at random times to ensure accuracy. Failure to mark the card when he is talking loudly results in two additional marks on his card. The teacher verbally reinforces accurate recording of target behavior(s). Table 4 shows the written behavioral intervention plan.

Table 4: Behavioral Intervention Plan

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Target behavior(s): Loud talking, measured as any instance in which someone on the opposite side of the classroom can hear Johnny during group cooperative learning activity time.

Measurement of Target behavior: Frequency count. Each instance will be counted and pointed out to Johnny to soften his voice.

Baseline data: Between two to eight occurrences, mean of four over a two-week period during cooperative group activity time

DRL initial standard: Four or fewer occurrences

Self-monitoring component: Teach the client to identify the occurrence of loud talking. Each instance Johnny will be told when such behavior occurs for a one-week period. Following that one-week period, the self-monitoring training will commence. He will learn how to record such instances by the teacher’s delaying by five seconds her appraisal of loud talking. This will give him an opportunity to identify such an instance and record it on the data form. Review the self-monitoring data at the end of the period to determine if he is within the DRL-A standard. Provide agreed upon reinforcer if Johnny achieves his target.

Target Behavioral Goal: One or fewer instances per period for three consecutive weeks.

Hypothetical example: Verbal outbursts and tantrums. Francesca has difficulty keeping her verbal outbursts or tantrum behavior in response to the supervisor corrections of her work to a reasonable level and form. During a ten-day baseline period, she had between three and seven verbal outbursts per day. in her second grade class. The supervisor, in conjunction with the behavioral consultant, has decided to initiate a DRL program of five or fewer instances per day as the standard for earning five points. If she has fewer than six instances of outbursts per day, she gets five points toward a Friday special activity with a friend during afternoon recess.
She needs 20 points for the Friday special activity. After eight days of the DRL program, her rate of verbal outbursts to corrections has consistently been below the standard for reinforcement. The number of outbursts is recorded in the second row of Table 5.

**Table 5: Number of Outbursts under DRL Program**

<table>
<thead>
<tr>
<th>Day</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Based on the success of achieving the initial standard, the consultant sets a new standard for the next eight days of three or fewer verbal outbursts. The resulting data across these eight days are the following rates of outbursts respectively: 3, 7, 3, 2, 3, 2, 3, and 2. The consultant then decides to set a new criterion of two or fewer. Once she is successful for two consecutive weeks at this initial behavioral standard, the DRL will be decreased to one or less per day. The target goal is to have no verbal outbursts per week for at least a three-week period. The consultant will continue to alter progressively the standard for the daily reinforcer until Francesca achieves her goal. When she does, a larger prize will be afforded to her for being successful with this program via a behavioral contract.

**Comprehension question check:**

1. How is a DRL similar to a DRO? How is it different?
2. How does the behavioral consultant progressively alter the rate of the target behavior when using a DRL program?

3. What can happen when the behavioral standard for the DRL is arbitrarily set without collecting baseline data?

4. Describe how you might set up a DRL program for a student’s unauthorized chatting with fellow students. Would you use it for just one student, or could your plan entail a DRL for him and his peers?

DIFFERENTIAL REINFORCEMENT OF ALTERNATIVE BEHAVIOR (DRA)

**Brief Description.** The DRA addresses behavior problems by producing a contrived reinforcer when a designated alternate, more appropriate behavior occurs. The DRA is specific to increasing an appropriate behavior by reinforcing its occurrence on a fixed-ratio-one schedule. Once the DRA establishes some base rate of performance of the alternate behavior, one can set a DRH.

**Procedures for DRA.** Teachers and clinicians should use the following procedures to set up a DRA program.

1. Identify alternative behavior(s) that will produce reinforcer.
(2) Identify reinforcer to be delivered (functional would be better than contrived).

(3) Collect baseline data on the frequency of this alternate behavior within the designated period prior to implementing the DRA program.

(4) Implement the program by providing the reinforcer whenever the behavior occurs (in some cases, prompting methods might be required to get the behavior to gain some level of occurrence to reinforce).

(5) Evaluate the effectiveness of the DRA program to produce a reliable rate of the alternate behavior while reducing the rate of the targeted problem behavior.

Hypothetical example: Request for help. Mary is a student with severe mental retardation and autism. She exhibits problem behaviors when she is in need of help with a difficult task she has to perform. She does not ask appropriately for help to perform such a task. Instead, she will throw a tantrum, by banging the desk, screaming, and throwing her work on the floor.

Mary’s teacher wants to teach Mary how to ask for help (see Table 6 for general teaching procedures for developing the request for “help“). She sets up a situation where she asks Mary to comply with some request that is difficult for Mary, e.g., "Go hang up your coat on the rack!” when the rack is above her hands" or "Open this jar!” when the jar cover is on very tight.” She stays in the vicinity, and when she sees that
Mary is in need of help, she gestures to Mary to request help (through vocal or non-vocal prompting method). When Mary asks for help (could be a non-vocal communication method as well), the teacher helps Mary. Mary’s teacher uses this format for many other situations in which Mary needs help (see Table 4.8 for details of teaching method).

**Table 6: General Procedures for Teaching a Request for Help**

1. Provide child with task that is difficult for him or her to perform independently, and instruct the child to begin task.
2. Time delay (0 - 2 seconds) a general prompt, “Anything wrong?”
3. If a request for help (e.g., a vocal response, sign or other form of communicating help) does not occur, provide general prompt.
4. If a non-vocal request for help does not occur in response to general prompt, physically guide the child to produce the manual sign or point to an appropriate symbol.
5. If vocal request does not occur, model request, e.g., “help” or “help, please.”
6. Reinforce request (vocal or nonvocal) for help by providing effective help to the child.
7. Across opportunities, provide less guidance until “help” response occurs independently upon presentation of difficult or ambiguous task instruction.
8. Use many different tasks and situations requiring help in teaching a generalized skill of requesting help.
9. Consider developing appropriate attention-getting behaviors in conjunction with this skill.
Hypothetical example: Reinforcing appropriate attention-getting behavior.

Some students with severe disabilities are incapable of getting the teaching staff’s attention (appropriately) under conditions in which they wish to indicate their needs or desires to the teacher. While they are capable of requesting items and activities, they do not spontaneously engage in such activities when needed. They will simply wait for the teacher to make face-to-face contact and prompt the student to request.

Maria is one such child. Maria’s special day class teacher, Ms. Thomas, wants to teach Maria how to get her attention when she wants something and is not in the immediate area of Maria. Maria’s teacher learns about a systematic method for teaching students to gain the teacher’s attention. It requires her not to be in close proximity to Maria when Maria wants something. To get her attention, Maria will walk up to the teacher and tap her on the shoulder. When she taps her on the shoulder, she will attend to Maria’s request. This DRA program will reinforce this form of appropriate attention getting, while not attending to other more undesirable forms such as grunts or screams (see Table 7 for general format).

She sets up a situation in which she asks Maria to comply with a request, e.g., "Go hang up your coat on the rack." Ms. Thomas makes sure that she needs an item in order to comply with her request, e.g., she removes hangers from the coat rack. Ms. Thomas then gestures to Maria to tap her on the shoulder (or say "teacher"). When Maria performs this behavior, the teacher turns to her and asks her what she wants. When Maria requests the hanger (could be vocal as well as nonverbal communication
method), the teacher gives the hanger to Mary. Ms Thomas uses this missing item format (see Cipani, 1988, Teaching Exceptional Children) for many other items. She gradually increases the distance she moves away from Maria so that Maria must learn how to locate the teacher in the room, tap her on the shoulder, and then when recognized, make her request. Eventually, this generalizes to times when Maria wants other items or activities in the absence of a teacher request for compliance.

Table 7: General Procedures for Teaching Appropriate Attention-getting Behavior

1. Develop several requesting or protesting skills
2. Ensure that the client wants or needs something by withholding it, or ensure that the client desires termination of some event by being presented with it and then leaving.
3. Face away from child and gesture to him or her to tap you on the arm.
4. Contingent upon the child’s tapping your arm (each time), turn and face the child and ask, “What do you want?”
5. Reinforce the child’s request by providing the desired item or removing the undesired item or event.
6. Repeat the above procedures several times (discrete trial format) until arm tapping is occurring consistently.
7. Move one to two feet away; then gesture for the child to tap your arm.
8. Reinforce the child's chain of behaviors Involving walking toward you and tapping you on the arm by saying, “What do you want?” Repeat steps 5 - 6.
9. Alter the distance you are from the child on consecutive sessions so that eventually the child can walk up to you wherever you are in the classroom area or other room, and exhibit appropriate attention-getting behavior.

**DIFFERENTIAL NEGATIVE REINFORCEMENT**

Differential reinforcement programs, which are described above this section, provide a positive reinforcer, whether it is attention or some tangible items or event as a function of meeting the behavioral standard. These programs are valuable in situations in which the MO is one of a slight to moderate level of deprivation of the event or item to be used as the contrived reinforcer.

The teacher can also deploy negative reinforcement paradigms, particularly in situations in which the student is motivated to terminate an undesired activity. In using negative reinforcement differentially, the reinforcer is the removal of the aversive event contingent upon the schedule requirements, whether they be DRO, DRH, DRA, or DRL. In the literature, these programs are termed DNRO, DNRA, etc. I will use the same acronyms as I used for the positive reinforcement programs, DRO, DRA except I will add an “E,” i.e., DRO-E, to designate a DRO schedule that produces escape (or avoidance). The DRL program does not have a suitable parallel in the escape form in school classrooms and will not be presented.
DIFFERENTIAL REINFORCEMENT OF OTHER BEHAVIOR – ESCAPE (DRO-E)

**Brief description.** The DRO-E schedule is procedurally the same as the DRO except that the reinforcer is the escape from a current aversive task or condition. The DRO-E provides a negative reinforcer for a student’s abstaining from performing a behavior, i.e., the absence of the problem behavior produces a termination of an aversive event. The DRO-E progressively decreases the rate of a problem behavior by allowing escape from an aversive condition if the student does not engage in the target behavior within a designated time interval. The designated time interval is called the DRO-E interval. The absence of behavior produces escape whereas the occurrence of the target behavior postpones escape for the length of the DRO-E interval. If the target behavior occurs, the DRO-E interval is reset. Therefore, differential reinforcement is based on the absence of a target behavior in a period of time.

A plan that gradually increases in-seat behavior, termed *Grandma’s Rule* for increasing in-seat behavior, is a great example of a DRO program (see Cipani, *Classroom management for all teachers*, 2008). Based on baseline data that compute the average in-seat interval, the teacher requires the child to be “in seat” for a short designated period of time. Therefore, the absence of out-of-seat behavior is implicit in this DRO program using a Premack contingency as the reinforcer. If the child stays “in
“Seat” for this time period and does not get out of his or her seat, the teacher would allow the child to get out of the seat for a period of time. If the child gets out of his or her seat, the DRO interval is reset for the full interval length.

For example, a DRO interval is set for five minutes for an elementary grade level student being served in a communicative disorders class. The teacher used baseline data to determine a reasonable DRO interval for her particular student. If the child gets out of the seat before the DRO interval lapses, she is brought back to her seat, and the timer is immediately reset for the full DRO interval five minutes. Therefore, instances of the target behavior result in a postponement of earned out-of-seat time. She earns four minutes of out-of-seat time (more probable event) for not getting out of her seat for the DRO interval, i.e., being in-seat (less probable event). Her escape from the in-seat activity is contingent upon staying in her seat continuously for five minutes.

As a result of this program, she begins to frequently earn out-of-seat time by not getting out of her seat for five minutes. With success the DRO interval can lengthen to seven minutes. With success at that criterion for escape, the teacher can progressively alter the DRO interval until the child can stay in her seat continuously for a reasonable period of time.
Procedures for DRO-E. Teachers should use the following procedures to set up a DRO program.

1. Identify target problem behavior(s) for decrease.
2. Identify antecedent conditions (i.e., MO and context) that currently provide for escape for the target behavior.
3. Collect baseline data on the frequency of this behavior within the designated class period in which the MO is presented prior to implementing the DRO-E program (same data collection as in the DRO).
4. Identify the initial behavioral standard for reinforcement (DRO-E interval) based on obtained baseline data, e.g., five-minute DRO-E interval.
5. If the child refrains from engaging in the target behavior for the interval length, as marked by a timing mechanism, terminate the aversive condition (MO) immediately by allowing him or her to escape with permission.
6. If the child engages in the target behavior, provide immediate feedback with respect to the occurrence of the behavior, and reset the timer for the full DRO-E interval while remaining in the nonpreferred condition.
5. Evaluate the effectiveness of the DRO-E program to produce a reliable rate of achievement of the behavioral standard across several weeks of implementation. Calculate the percentage of intervals achieving standard across the number possible.
(6) If the child achieves success in reaching the initial criterion, progressively increase the behavioral standard for reinforcement for the next several weeks.

(7) Continue progressive changes in the behavioral standard across time until the child achieves the desired level, e.g., 50 minutes without a target behavior problem occurring.

How long should the DRO-E interval be? The same baseline data that are used for the DRO program are collected for the DRO-E program. For example, a student named Antonio may find oral group reading an unpleasant condition. The oral reading period for him averages about ten minutes during an hour and a half reading period. He engages in a number of interfering behaviors such as getting up, talking to peers, complaining about having to read, and making verbal insults to peers. We will target these examples as a response class called interfering behavior. The chart below provides data on the frequency of the target behavior and the actual length of the oral reading period (Table 8).

**Table 8: Data from Oral Reading Period**

<table>
<thead>
<tr>
<th>Date</th>
<th>Frequency of target behavior</th>
<th>Duration of data session (in minutes)</th>
<th>Average nonoccurrence interval length (in minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-10</td>
<td>2</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Ennio Cipani, Ph.D. for use with text Functional behavioral assessment, diagnosis, and treatment with author’s permission
Note that the one oral reading session that is highest is when the period “runs on” for 15 minutes! That is telling data about this student’s tolerance level for this instructional format. If you throw that out, his range of refraining from the target behavior is between four and ten minutes (see last column in red font). The teacher sets up a DRO-E program based on this baseline data. The program allows him to escape the oral reading task if he refrains from exhibiting the target behavior for the DRO-E interval of five minutes (i.e., the behavioral standard). Refraining from this behavior produces immediate escape. As he achieves success with the initial DRO-E interval, the teacher will gradually lengthen the DRO interval, thus producing an even lower rate of the target problem behavior.

**Hypothetical example: Verbal outbursts and tantrums.** Berta has difficulty keeping her verbal outbursts and inappropriate language to a reasonable level and form. Such behaviors are often in response to certain instructional tasks and materials. She hates writing tasks, which usually last about 15-25 minutes each day. During a
six-day baseline period in her eighth grade language arts class, she has between two and four verbal outbursts during the writing task. On average she is engaging in a verbal outburst about once every eight minutes.

The teacher has decided to initiate a DRO-E program with a DRO-E interval of eight minutes. If she refrains from a verbal outburst for the DRO-E interval, she can stop the writing task and get three minutes of reading time immediately before returning to the writing task. As an additional contingency, if she earns six minutes of reading time on a given day, she can have three points toward a special Friday afternoon activity.

**Comprehension question check**

1. What is the one difference between a DRO-E and a DRO program?
2. What is the aversive condition for Berta during the baseline assessment?
3. Explain why the DRO-E program for Antonio needs to use escape from the instructional activity as the contingency for the absence of the target behavior? Why would that contingency be more powerful than using stickers on his paper as the contingency? Explain why stickers may not be an effective contingency in the long term based on the principle of satiation.
4. What happens when the student achieves the in-seat standard in the Grandma’s Rule program (Cipani, 2008). What is the functional reinforcer? Why might the program fail with some students if the out-of-seat time is not granted immediately?
DIFFERENTIAL REINFORCEMENT OF HIGH RATE BEHAVIOR – ESCAPE (DRH-E)

**Brief description.** The DRH-E is a differential reinforcement program that progressively increases the rate of a desired behavior by allowing the child a predetermined minimal rate of the target behavior in order to escape the currently existing aversive event. The DRH-E schedule is the same procedurally as the DRH except the reinforcer is the termination of the aversive event. The teacher should set the initial DRH-E schedule to facilitate success. When the level of behavior matches or exceeds the designated criterion level repeatedly, the teacher can set a higher DRH standard. This allows the teacher to increase gradually the rate of acceptable behavior. The initial value selected as the DRH-E behavioral standard needs to be a function of the collected baseline data. The baseline data are collected in the same manner as in the DRH program.

**Procedures for DRH-E.** The teacher should use the following procedures to set up a DRH program:

1. Identify target (appropriate) behavior(s) for increase.
(2) Identify aversive event to be presented.

(3) Prior to implementing the DRH-E program, collect baseline data on the frequency of this behavior when that event is existent.

(4) Identify the initial behavioral standard for reinforcement (high rate of behavior) based on obtained baseline data e.g., five occurrences or more.

(5) If the child achieves the behavioral standard by reaching or exceeding the minimal rate of the target appropriate behavior within the designated time, remove him or her from the existing (aversive) condition. If the child does not reach the behavioral standard, do not allow escape.

5) Evaluate the effectiveness of the DRH-E program to produce a reliable rate of success in achieving the behavioral standard across several weeks of implementation.

(6) If the child achieves success in reaching the initial criterion, progressively increase the behavioral standard for reinforcement for the next several weeks.

(7) Continue progressive changes in the behavioral standard across time until the child achieves the desired level of the appropriate behavior.

Hypothetical example: Reading comprehension in science class. Raul is a child with mild disabilities in a mainstream high school science class. Even though the teacher makes his work in the class less difficult by providing a number of
instructional accommodations, Raul still does not like to read material related to science and answer questions. He says it is boring and complains that he does not see the need for his participation in the class. He does enjoy going to the class to see students from his neighborhood but finds the class work aversive. In the past, the instructional aide would give him the answers to the questions. The only independent requirement was that Raul had to write the answers. He often responded to the questions about the science content with “I do not know.” As a result, the aide enabled Raul’s verbal behavior by giving him the answer. This had further ramifications in that his motivation to read the material decreased over the school year, thus impacting his reading ability.

The current special education teacher wants Raul to acquire greater reading competence, both in reading words as well as comprehension. His teacher feels that the prior strategy was simply enabling him to rely on the instructional aide far too much to complete the assignment. The teacher has told the aide to have him read the material and answer the questions on his own. However, the aide will better prepare Raul for the science reading via a number of instructional procedures. In addition to previewing the material with him prior to Raul’s reading, the aide will also write synonyms for words that are above Raul’s comprehension level in pencil next to the unfamiliar word. Finally, a DRH-E program that targets Raul’s independent reading of the paragraphs of the science text and answering questions is designed.
The DRH-E program selected the behavioral standard for escape from this task from baseline data collected. The teacher determined that four paragraphs with the corresponding questions was a reasonable initial standard. If Raul completes this amount of work during the science period, he gets the remainder of the assignment delivered in the prior manner, i.e., the aide would provide sufficient help. However, he needs to finish that much—four paragraphs with related questions—in order to proceed with the assignment in a more accommodating format. As Raul becomes successful with this criterion, the teacher will increase progressively the number of paragraphs he must finish with less help. The terminal goal is for Raul to engage in his science assignment in a semi-independent manner for at least three weeks in the mainstream setting.
DIFFERENTIAL REINFORCEMENT OF ALTERNATE BEHAVIOR – ESCAPE (DRA-E)

**Brief Description.** The DRA-E addresses behavior problems by developing an alternate more appropriate behavior to escape an aversive condition. The DRA-E is specific to increasing an appropriate behavior by negatively reinforcing its occurrence on a fixed-ratio one schedule. Once the DRA-E establishes some base rate of performance of the alternate behavior, the clinician or teacher might set a DRH-E.

**Procedures for DRA-E.** Use the following procedures to set up a DRA-E program:

1. Identify target alternative behavior(s) that will compete with the escape function of the problem behavior.

2. Identify functional reinforcer **you** wish to deliver, i.e., event that will be terminated contingent upon alternate behavior.

3. Prior to implementing the DRA-E program, collect baseline data on the frequency of this behavior within the designated period.

4. Implement the program by removing the aversive event whenever the behavior occurs (in some cases, you may need to use...
(5) Evaluate the effectiveness of the DRA-E program to produce a reliable rate of the alternate behavior while reducing the rate of the undesirable target problem behavior.

Developing protesting skills. A hypothetical lunch aide supervisor has a student named Mark who engages in self-abusive behavior during lunch time. The lunch aides have no idea why this was occurring. It does not happen every day; sometimes he just eats his lunch. After one week of observation, the behavioral consultant identifies that Mark's self-abuse occurs when he is given a food item that he doesn't want to eat. The consultant has decided to teach the manual sign “no” in response to being offered a non-preferred food item. She wants to develop this skill rapidly, so she will conduct training outside the cafeteria venue, with many opportunities to reinforce the protest, “No.” During the training she alternates between preferred food items and items he dislikes. When he is offered a food item he dislikes, she prompts the desired sign response from Mark. Contingent upon the protest, “No,” she removes that food item. The training procedures are detailed in Table 9. Gradually, the consultant fades the prompts so that Mark spontaneously signs, "No, please!" when he wishes to avoid having to eat certain non-preferred foods.
Table 9: Procedures for Developing Protest Behavior

(1) Present child with non-preferred task, object, or activity (e.g., a wash cloth, stone, or sitting in a wet seat), with instruction (e.g., “Here, have this.” “Do this.”)

(2) Time delay (0 - 2 seconds). Then use a general prompt, “What’s wrong?”

(3) Reinforce the desired protest response, i.e., signing “No!”

(4) If protest response does not occur after general prompt, physically guide the manual sign “no.”

(5) Reinforce protest by removing the nonpreferred item or object or stopping the activity and initiating a more preferred activity.

(6) During subsequent protest opportunities, provide less guidance (or modeling) of the protest response until it occurs independently and immediately after the presentation of the non-preferred task, object, or activity.

(7) Use many different non-preferred activities and objects during structured training sessions to teach a generalized skill of protesting.

(8) Consider developing appropriate attention-getting behavior in conjunction with this skill.

(9) Provide opportunities for protesting behaviors in real life by occasionally handing the client a non-preferred item or engaging him or her in a non-preferred activity. Reinforce protest with removal of non-preferred item or activity.

Mark acquires the skill of protesting within two weeks of the structured training program. This skill generalizes to the cafeteria, where the lunch aide interprets what the sign “no” means and mediates such by removing the nonpreferred food item. The behavioral consultant decides to add to this program by teaching Mark how to then
request the desired item if it is available in the immediate area. She selects snack time so
that she can conduct the training when Mark expects food. She sets up a situation during
snack in which the food or drink item is not readily present. She prompts Mark to sign
“eat ___” (and the item desired). She follows the training program detailed in Table 4.10.

Table 4.10: Procedures for Developing Requesting Skills

(1) Identify the reinforcer(s) (e.g., food, toys, drink, and/or physical contact).

(2) Identify time/setting when reinforcer is not readily available and the client is slightly deprived of it (i.e., wants it).

(3) Determine the response to be targeted for reinforcement (with access to specific reinforcer) e.g., vocal response, signed response, pointing to a communication board, etc.

(4) Present the general instruction “What do you want?” with the item/object/activity within sight.

(5) Use an effective prompt to obtain the request (whether it be a gesture, model or physical prompt).

(6) Contingent upon the occurrence at the response, present the reinforcer in small quantities, (e.g., a piece of food) or short duration (e.g., two minutes of toy play).

(7) Repeat steps 3 - 6 during a structured training session (up to five minutes, depending upon what is reinforced).

(8) Provide less of a prompt across opportunities and time delay the presentation on the prompt, allowing the student the opportunity to respond ahead of the prompt.

(9) Provide opportunities for requesting in real life by occasionally depriving the student of some reinforcer for a brief period of time, reinforcing (and if necessary) prompting request.
SUMMARY

The use of differential reinforcement procedures as behavior reduction procedures can be of significant aid to the classroom teacher. One can use such procedures to deliver positive reinforcers such as the DRO, DRA, or remove aversive events such as DRA-E or DRO-E. It is fruitful if an identified functional reinforcer is used in the particular differential reinforcement program. However, in many cases, the teacher can deploy the designation of a contrived reinforcement contingency and be successful. The teacher must take steps to ensure that access to the reinforcer or escape from the aversive condition will be powerful enough to exert its effect on the display of the problem behavior.