# AFIRM
Autism Focused Intervention Resources & Modules

This overview brief will support your use of the evidence-based practice: Differential Reinforcement.

**For more information visit:**
www.afirm.fpg.unc.edu

## DIFFERENTIAL REINFORCEMENT (DR)
## ---EBP Brief Packet---

### Components of the EBP Brief Packet...

This evidence-based practice overview on Differential Reinforcement includes the following components:

1. **Overview:** A quick summary of salient features of the practice, including what it is, who it can be used with, what skills it has been used with, and settings for instruction.
2. **Evidence-base:** The *DR Evidence-base* details the NPDC criteria for inclusion as an evidence-based practice and the specific studies that meet the criteria for this practice.
3. **Step-by-Step Guide:** Use the *DR Step-by-Step Practice Guide* as an outline for how to plan for, use, and monitor DR. Each step includes a brief description as a helpful reminder while learning the process.
4. **Implementation Checklist:** Use the *DR Implementation Checklist* to determine if the practice is being implemented as intended.
5. **Data Collection Sheets:** Use the data collection sheets as a method to collect and analyze data to determine if progress is being made for a learner with ASD.
6. **Tip Sheet for Professionals:** Use the *DR Tip Sheet for Professionals* as a supplemental resource to help provide basic information about the practice to professionals working with the learner with ASD.
7. **Parent Guide:** Use the *DR Parent Guide* to help parents or family members understand basic information about the practice being used with their child.
8. **Additional Resources:** Use the *Additional Resources* to learn more about the practice.
9. **CEC Standards:** A list of *CEC Standards* that apply specifically to DR.
10. **Module References:** A list of numerical *References* utilized for the DR module.

### Suggested citation:

Savage, M. N., & AFIRM Team. (2017). *Differential reinforcement.* Chapel Hill, NC: National Professional Development Center on Autism Spectrum Disorders, FPG Child Development Center, University of North Carolina. Retrieved from http://afirm.fpg.unc.edu/differential-reinforcement
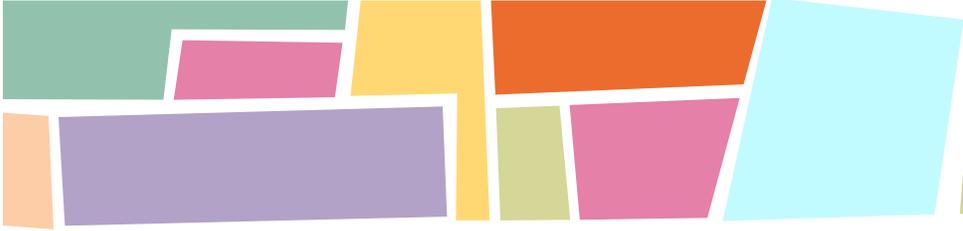
## What Are DR?

Differential reinforcement (DR) is an application of reinforcement designed to reduce the occurrence of interfering behaviors (e.g., tantrums, aggression, self-injury, stereotypic behavior). The rationale for differential reinforcement is that by (a) reinforcing the nonoccurrence or decreased occurrence of interfering behaviors *or* (b) reinforcing behaviors that are more functional or incompatible with the interfering behavior, then interfering behaviors will decrease.

## Evidence-base

Differential reinforcement meets the evidence-based practice criteria set by NPDC with 25 single case design studies. The practice has been effective for preschool (3–5 years) to high school–age learners (15–22) with ASD. Evidence-based practices (EBPs) and studies included in the 2014 EBP report detailed how differential reinforcement can be used effectively to address: social, communication, behavior, joint attention, play, school readiness, academic, motor, and adaptive outcomes.

## How Is DR Being Used?

DR can be used by a variety of professionals, including teachers, special educators, therapists, paraprofessionals, and early interventionists in educational and community-based environments. Parents and family members also can use DR in the home.

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---Evidence-base for Differential Reinforcement---

The National Professional Development Center on ASD has adopted the following criteria to determine if a practice is evidence-based. The EBP Report provides more information about the review process (Wong et al., 2014).
Efficacy must be established through high quality, peer-reviewed research in scientific journals using:
- randomized or quasi-experimental design studies (two high quality experimental or quasi-experimental group design studies),
- single-subject design studies (three different investigators or research groups must have conducted five high quality single subject design studies), or
- combination of evidence [one high quality randomized or quasi-experimental group design study and three high quality single subject design studies conducted by at least three different investigators or research groups (across the group and single subject design studies)].

## --OVERVIEW--

Differential reinforcement is an application of reinforcement designed to reduce the occurrence of interfering behaviors (e.g., aggression, self-injury, stereotypic behavior). Differential reinforcement meets the evidence-based practice criteria with 25 single case design studies. The practice has been effective with learners in preschool (3-5 years) to high school learners (15-22 years). Studies included in the 2014 EBP report detailed how differential reinforcement can be used effectively to address: social, communication, joint attention, behavior, school-readiness, play, motor, adaptive, and academic outcomes.

In the table below, the outcomes identified by the evidence base are shown by age of participants.

| Early Intervention (0-2) | Preschool (3-5) | Elementary (6-11) | Middle (12-14) | High (15-22) |
|---|---|---|---|---|
| | Social | Social | Social | |
| | | Communication | Communication | |
| | | Joint Attention | | |
| | Behavior | Behavior | Behavior | Behavior |
| | School-Readiness | School-Readiness | School-Readiness | |
| | | Play | | |
| | | | Motor | |
| | | Adaptive | | Adaptive |
| | | Academic | | |
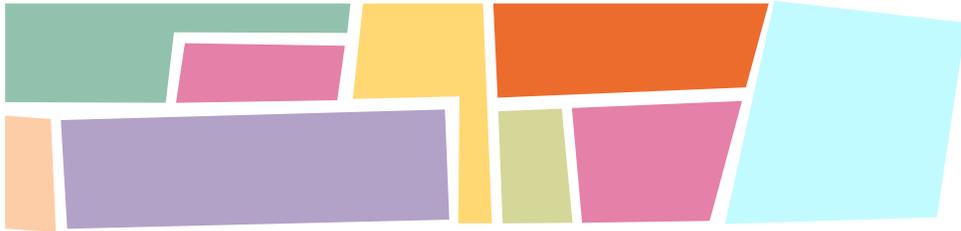
## Early intervention (0-2 years)

No studies

## Preschool (3-5 years)

*Buckley, S. D., Strunck, P. G., & Newchok, D. K. (2005). A comparison of two multicomponent procedures to increase food consumption. *Behavioral Interventions, 20*(2), 139-146. doi: 10.1002/bin.188

Call, N. A., Pabico, R. S., Findley, A. J., & Valentino, A. L. (2011). Differential reinforcement with and without blocking as treatment for elopement. *Journal of Applied Behavior Analysis, 44*(4), 903-907. doi: 10.1901/jaba.2011.44-903

*Charlop-Christy, M. H., & Haymes, L. K. (1996). Using obsessions as reinforcers with and without mild reductive procedures to decrease inappropriate behaviors of children with autism. *Journal of Autism and Developmental Disorders, 26*(5), 527-546. doi: 10.1007/BF02172274

Marcus, B. A., & Vollmer, T. R. (1996). Combining noncontingent reinforcement and differential reinforcement schedules as treatment for aberrant behavior. *Journal of Applied Behavior Analysis, 29(*1), 43-51. doi: 10.1901/jaba.1996.29-43

* Newman, B., Tuntigina, L., Ryan, C.S., & Reinecke, D.R. (1997). Self-management of a DRO procedure by three students with autism. *Behavioral Intervention*, 12, 149–156.

Pelios, L. V., MacDuff, G. S., & Axelrod, S. (2003). The effects of a treatment package in establishing independent academic work skills in children with autism. *Education and Treatment of Children, 26*(1), 1-21.

Taylor, B. A., Hoch, H., & Weissman, M. (2005). The analysis and treatment of vocal stereotypy in a child with autism. *Behavioral Interventions, 20*(4), 239-253. doi: 10.1002/bin.200

## Elementary (6-11 years)

Bergstrom, R., Tarbox, J., & Gutshall, K. A. (2011). Behavioral intervention for domestic pet mistreatment in a young child with autism. *Research in Autism Spectrum Disorders, 5*(1), 218-221. doi: 10.1016/j.rasd.2010.04.002

*Buckley, S. D., & Newchok, D. K. (2005). An evaluation of simultaneous presentation and differential reinforcement with response cost to reduce packing. *Journal of Applied Behavior Analysis, 38*(3), 405-409. doi: 10.1901/jaba.2005.71-04

*Charlop-Christy, M. H., & Haymes, L. K. (1996). Using obsessions as reinforcers with and without mild reductive procedures to decrease inappropriate behaviors of children with autism. *Journal of Autism and Developmental Disorders, 26*(5), 527-546. doi: 10.1007/BF02172274

## Elementary (6-11 years continued)

Egan, P. J., Zlomke, L. C., & Bush, B. R. (1993). Utilizing functional assessment, behavioral consultation and videotape review of treatment to reduce aggression: A case study. *Special Services in the Schools, 7(*1), 27-37. doi: 10.1300/J008v07n01_02

*Hammond, J. L., Iwata, B. A., Fritz, J. N., & Dempsey, C. M. (2011). Evaluation of fixed momentary DRO schedules under signaled and unsignaled arrangements. *Journal of Applied Behavior Analysis, 44*(1), 69-81. doi: 10.1901/jaba.2011.44-69

Kelley, M. E., Shamlian, K., Lomas, J. E., & Pabico, R. S. (2011). Pre-assessment exposure to schedule-correlated stimuli affects choice responding for tasks. *Research in Developmental Disabilities, 32*(2), 527-531. doi: 10.1016/j.ridd.2010.12.029

Lee, R., McComas, J. J., & Jawor, J. (2002). The effects of differential and lag reinforcement schedules on varied verbal responding by individuals with autism. *Journal of Applied Behavior Analysis, 35*(4), 391-402. doi: 10.1901/jaba.2002.35-391

* Newman, B., Tuntigina, L., Ryan, C.S., & Reinecke, D.R. (1997). Self-management of a DRO procedure by three students with autism. *Behavioral Intervention*, 12, 149–156.

Patel, M. R., Carr, J. E., Kim, C., Robles, A., & Eastridge, D. (2000). Functional analysis of aberrant behavior maintained by automatic reinforcement: Assessments of specific sensory reinforcers. *Research in Developmental Disabilities, 21*(5), 393-407. doi: 10.1016/S0891-4222(00)00051-2

Pelios, L. V., MacDuff, G. S., & Axelrod, S. (2003). The effects of a treatment package in establishing independent academic work skills in children with autism. *Education and Treatment of Children, 26*(1), 1-21.

*Piazza, C. C., Moes, D. R., & Fisher, W. W. (1996). Differential reinforcement of alternative behavior and demand fading in the treatment of escape - maintained destructive behavior. *Journal of Applied Behavior Analysis, 29*(4), 569-572. doi: 10.1901/jaba.1996.29-569

Reed, G. K., Ringdahl, J. E., Wacker, D. P., Barretto, A., & Andelman, M. S. (2005). The effects of fixed-time and contingent schedules of negative reinforcement on compliance and aberrant behavior. *Research in Developmental Disabilities, 26*(3), 281-295. doi: 10.1016/j.ridd.2004.01.004

Rozenblat, E., Brown, J. L., Brown, A. K., Reeve, S. A., & Reeve, K. F. (2009). Effects of adjusting DRO schedules on the reduction of stereotypic vocalizations in children with autism. *Behavioral Interventions, 24*(1), 1-15. doi: 10.1002/bin.270

Thompson, M. J., McLaughlin, T. F., & Derby, K. M. (2011). The use of differential reinforcement to decrease the inappropriate verbalizations of a nine-year-old girl with autism. *Electronic Journal of Research in Educational Psychology, 9*(1), 183-196.
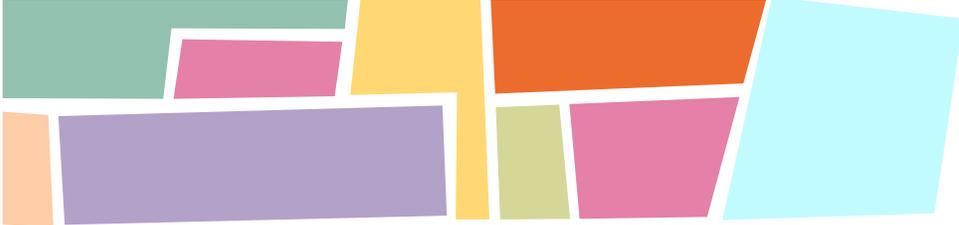
## Middle (12-14 years)

Adelinis, J. D., Piazza, C. C., & Goh, H. L. (2001). Treatment of multiply controlled destructive behavior with food reinforcement. *Journal of Applied Behavior Analysis, 34*(1), 97-100. doi: 10.1901/jaba.2001.34-97

Hagopian, L. P., Kuhn, D. E., & Strother, G. E. (2009). Targeting social skills deficits in an adolescent with pervasive developmental disorder. *Journal of Applied Behavior Analysis, 42*(4), 907. doi: 10.1901/jaba.2009.42-907

*Hammond, J. L., Iwata, B. A., Fritz, J. N., & Dempsey, C. M. (2011). Evaluation of fixed momentary DRO schedules under signaled and unsignaled arrangements. *Journal of Applied Behavior Analysis, 44*(1), 69-81. doi: 10.1901/jaba.2011.44-69

*Napolitano, D. A., Smith, T., Zarcone, J. R., Goodkin, K., & McAdam, D. B. (2010). Increasing response diversity in children with autism. *Journal of Applied Behavior Analysis, 43*(2), 265-271. doi: 10.1901/jaba.2010.43-265

* Newman, B., Tuntigina, L., Ryan, C.S., & Reinecke, D.R. (1997). Self-management of a DRO procedure by three students with autism. *Behavioral Intervention*, 12, 149–156.

*Piazza, C. C., Moes, D. R., & Fisher, W. W. (1996). Differential reinforcement of alternative behavior and demand fading in the treatment of escape‐maintained destructive behavior. *Journal of Applied Behavior Analysis, 29*(4), 569-572. doi: 10.1901/jaba.1996.29-569

## High (15-22 years)

*Hammond, J. L., Iwata, B. A., Fritz, J. N., & Dempsey, C. M. (2011). Evaluation of fixed momentary DRO schedules under signaled and unsignaled arrangements. *Journal of Applied Behavior Analysis, 44*(1), 69-81. doi: 10.1901/jaba.2011.44-69

Healey, J. J., Ahearn, W. H., Graff, R. B., & Libby, M. E. (2001). Extended analysis and treatment of self‐injurious behavior. *Behavioral Interventions, 16*(3), 181-195. doi: 10.1002/bin.91

Kerth, D. M., Progar, P. R., & Morales, S. (2009). The effects of non‐contingent self‐restraint on self‐injury. Journal of Applied *Research in Intellectual Disabilities, 22*(2), 187-193. doi: 10.1111/j.1468-3148.2008.00487.x

Shabani, D. B., & Fisher, W. W. (2006). Stimulus fading and differential reinforcement for the treatment of needle phobia in a youth with autism. *Journal of Applied Behavior Analysis, 39*(4), 449-452. doi: 10.1901/jaba.2006.30-05

Tiger, J. H., Fisher, W. W., & Bouxsein, K. J. (2009). Therapist‐ and self‐monitored DRO contingencies as a treatment for the self‐injurious skin picking of a young man with Asperger syndrome. *Journal of Applied Behavior Analysis, 42*(2), 315-319. doi: 10.1901/jaba.2009.42-315

* Research which included participants in multiple age ranges.
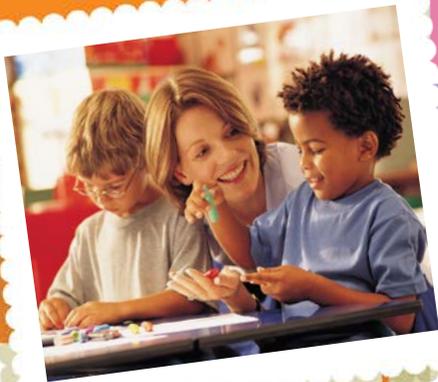
# Differential Reinforcement (DR)
## ---Step-by-Step Guide---

This practice guide outlines how to plan for, use, and monitor the practice of **Differential Reinforcement**.

Keep in mind that **Differential Reinforcement** can be used to decrease inappropriate behaviors and increase appropriate behaviors.



## BEFORE YOU START...

Each of the following points is important to address so that you can be sure the selected EBP is likely to address the learning needs of your student.

Have you found out more information about. . .?

☐ Established a goal or outcome that clearly states when the behavior will occur, what the target skill is, and how the team will know when the skill is mastered...

☐ Identifying evidence-based practices...

If the answer to any of these is "no," review the process of how to select an EBP.

For more information, visit:
www.afirm.fpg.unc.edu

# Now you are ready to start...

## Step 1: Planning

The planning step explains initials steps and considerations involved when using DR as an intervention for a learner.

### 1.1  Identify and define interfering behavior through an FBA

To assist in identifying a behavior that interferes with learning and/or daily function, team members should complete a functional behavior assessment (FBA).

> *Note:*  Check out the module on FBA for more information about this specific process.

📄 *Use the FBA Sheet (ABC Chart) to determine the function of an interfering behavior.*

Team members should gather information from each other regarding the topography, frequency, intensity, location, and duration of the interfering behavior.

### 1.2  Select a differential reinforcement strategy

When deciding which differential reinforcement procedure to use, determine what the main goal is for the interfering behavior. If the main goal is to eliminate the behavior and not introduce a replacement, then choose DRO. If the main goal is to reduce the interfering behavior, then choose DRL. If the main goal is to substitute the interfering behavior with a more functional and appropriate behavior, then choose DRA or DRI.

- If using DRI, also select incompatible behavior.
- If using DRA, also select alternative behavior.

📄 *Use the DR Procedures Guide to select a procedure.*

### 1.3  Collect baseline data on interfering behavior

Collect data in a variety of settings and activities to determine how often the learner with ASD is using the interfering behavior.

Data sheets will help you collect data on the interfering behavior in order to determine if the trend is stable to begin using differential reinforcement.

📄 *Use the Frequency Data Sheet to collect the frequency of an interfering behavior.*

📄 *Use the Duration Data Sheet to collect the duration of an interfering behavior.*

📄 *Use the Partial Interval Data Sheet to collect data on an interfering behavior during intervals.*

### 1.4  Identify Reinforcers

If choosing a DRO or DRL strategy, the reinforcer should be of at least equal strength or motivating value at which is currently maintaining the interfering behavior.

If choosing a DRI or DRA strategy, the reinforcer should be the same type and/or equivalent to the reinforcement they received when engaging in the interfering behavior.

## Step 1: Planning (continued)

### 1.5 Determine schedule of reinforcement

The process for determining the schedule of reinforcement is different depending on the differential reinforcement procedure.

a. Schedule of reinforcement for DRO
1. Determine the average IRT from baseline data.
2. Start with a slightly smaller interval than the average IRT for the initial DRO interval.
b. Schedule of reinforcement for DRL
1. Start the initial response criterion at the average occurrences from baseline.
2. Response criterion will continue to decrease gradually until the learner is continually engaging in the interfering behavior at the predetermined, more appropriate rate.
c. Schedule of reinforcement for DRI/DRA
1. When first beginning to use a DRI or DRA procedure, use continuous reinforcement.
2. Once the learner is successful, move to using an intermittent schedule and gradually thin the reinforcement schedule.

### 1.6 Prepare materials

Team members should make sure they have all materials needed for using differential reinforcement such as data collection sheets, timers, and reinforcers.

Team members also need to determine if additional materials such as a self-monitoring chart or visuals will be used when implemented differential reinforcement procedures.

## Step 2: Using

This section describes the process of implementing DR, including deliver reinforcers and addressing generalization.

### 2.1 Meet with the learner

*DRO - Differential Reinforcement of Other Behaviors*

Discuss the interfering behavior you want the learner to eliminate and explain how the learner can earn a reinforcer.

- Think about what tools you can use to help the learner understand what's being discussed at the meeting (e.g., pictures, video models).
- If other procedures will be used with DRO, introduce them to the learner.

## Step 2: Using (continued)

### 2.1  Meet with the learner (continued)

*DRL - Differential Reinforcement of Low Rates of Behavior*
Discuss the interfering behavior you want the learner to reduce and explain how the learner can earn a reinforcer
- Think about what tools you can use to help the learner understand what's being discussed at the meeting (e.g., pictures, video models).
- If other procedures will be used with DRL, introduce them to the learner (e.g., self-monitoring chart).
- Inform the learner about the number of instances allowed.

*DRI/DRA - Differential Reinforcement of Incompatible Behavior/Differential Reinforcement of Alternative Behavior*
Discuss the replacement behavior (incompatible or alternative behavior) with the learner and explain how the learner can earn a reinforcer
- Team members may also have to use an additional strategy such as functional communication training to teach the use of the replacement behavior.

### 2.2  Follow reinforcement schedule

*DRO - Differential Reinforcement of Other Behaviors*
- Deliver reinforcer if criterion is met.
- If interfering behavior occurs, reset timer or wait for next interval to try again.
- When the learner engages in the interfering behavior, inform the learner they did not earn the reinforcer and they can try again.
- To maintain the reinforcer as a motivator, make sure the learner does not have. access to the reinforcer outside of being used for the DRO procedure.
- As the learner makes progress, gradually increase the DRO interval.

*DRL - Differential Reinforcement of Low Rates of Behavior*
- At the end of the interval or session if the limit is met, deliver the reinforcer.
- If the limit is not met, withhold the reinforcer and provide feedback to the learner to help the learner monitor their rate of responding. Inform the learner they did not earn the reinforcer, but that they can try again.
- As the learner makes progress, gradually reduce the number of responses allowed per session or interval. If using interval DRL, team members can also increase the duration of the interval.

## Step 2: Using (continued)

### 2.2 Follow reinforcement schedule (continued)

*DRI/DRA - Differential Reinforcement of Incompatible Behavior/Differential Reinforcement of Alternative Behavior*
- If the interfering behavior occurs put the behavior on extinction or interrupt and redirect the learner to the replacement behavior.
- Deliver reinforcer when replacement behavior used and meets criterion
- If learner is successful with a continuous schedule of reinforcement, move onto an intermittent schedule.

### 2.3 Generalize procedure to other settings

When the interfering behavior is eliminated or predetermined criterion is met, team members should use DRO, DRL, DRI, or DRA procedures in additional settings or different times in the learner's natural environments.

Having different team members such as teachers, the speech pathologist, and paraprofessionals use the DRO, DRL, DRI, or DRA procedure can also help generalize the intervention effects.

## Step 3: Monitoring

The following process describes how interfering behaviors can be monitored and how this data can be used to guide further support of the learner.

### 3.1 Collect data on target behaviors

Use the same type of data collection and same data collection forms used in baseline.
- *Use the Frequency Data Sheet to collect the frequency of an interfering behavior.*
- *Use the Duration Data Sheet to collect the duration of an interfering behavior.*
- *Use the Partial Interval Data Sheet to collect data on an interfering behavior during intervals.*

### 3.2 Adjust reinforcement schedule based on performance criteria

- If using DRO, increase the interval as the learner is successful.
- If using DRL, decrease the number of allowances as the learner is successful.
- For DRI/DRA, if using a continuous schedule move to an intermittent schedule and continue to fade reinforcers.
- If the interfering behavior is not decreasing, team members can work together to determine potential solutions to issues.

## Step 3: Monitoring (continued)

### 3.3   Determine next steps based on learner progress

If the learner with ASD is showing progress, then continue to use differential reinforcement.

If the learner with ASD is not showing progress with differential reinforcement, ask yourself the following questions:

- Is the target skill or behavior well defined?
- Is the skill or behavior measurable and observable?
- If using DRI or DRA, does the incompatible/alternative behavior need to be taught?
- Was differential reinforcement used with fidelity?
- If using DRO, DRL, or DRI, is the reinforcer strong enough?
- If using DRA, does the reinforcer provide the same function as the interfering behavior?
- Have you tried adjusting the reinforcement schedule?
- Are all team members using differential reinforcement consistently?

If these issues have been addressed and the learner with ASD continues to not show progress, consider selecting a different evidence-based practice to use with the learner.

# Differential Reinforcement (DR)
## ---Implementation Checklist---

| | Observation | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| | Date | | | | |
| | Observer's Initials | | | | |
| **Step 1:  Planning** | | | | | |
| 1.1 Conduct a functional behavior assessment | | | | | |
| 1.2 Select a differential reinforcement strategy: *DRO, DRL, DRI,* or *DRA* | | | | | |
| ☐ Select an incompatible behavior (*DRI*) or alternative behavior *(DRA)*, if applicable | | | | | |
| 1.3 Collect baseline data | | | | | |
| 1.4 Identify reinforcers | | | | | |
| 1.5 Determine schedule of reinforcement | | | | | |
| 1.6 Prepare materials | | | | | |
| **Step 2:  Using** | | | | | |
| 2.1 Meet with the learner | | | | | |
| 2.2 Follow reinforcement schedule | | | | | |
| 2.3 Generalize DR ( *DRO, DRL, DRI,* or *DRA*) strategy to other settings and times | | | | | |
| **Step 3:  Monitoring** | | | | | |
| 3.1 Collect and analyze data | | | | | |
| 3.2 Adjust reinforcement schedule based on performance criteria | | | | | |
| 3.3 Determine next steps based on learner progress | | | | | |

AFIRM | Autism Focused Intervention Resources and Modules

# ---DR Procedures Guide---

**AFIRM**

Autism Focused Intervention Resources & Modules

Learner's Name: _____     Date/Time: _____

Observer(s): _____

Target Behavior(s): _____

_____

## Select a Differential Reinforcement Procedure:

The planning steps for each differential reinforcement procedure are different. You must first decide which differential reinforcement procedure would be appropriate. Multiple options may be appropriate to try with the learner.

| Procedure | When to Use | Examples of Interfering Behavior |
|---|---|---|
| DRO | *Main goal is to eliminate the interfering behavior:*<br>• The behavior is unacceptable<br>• Student has other appropriate behaviors in his/her repertoire | • Hitting peers<br>• Self-injurious behaviors<br>• Elopement |
| DRL | *Main goal is to reduce the interfering behavior:*<br>• The behavior is irritating or disruptive at high frequency, but could be tolerable or even appropriate if displayed less frequently<br>• The behavior is non-violent<br>• The behavior is not self-destructive | • Asking questions<br>• Burping<br>• Cursing |
| DRI | *Main goal is to substitute the interfering behavior:*<br>• There is an appropriate behavior that can't co-exist with the interfering behavior | • Out of seat<br>• Screaming<br>• Verbal aggression |
| DRA | *Main goal is to substitute the interfering behavior:*<br>• There is an appropriate alternative behavior, but it could co-exist with the interfering behavior | • Screaming<br>• Talk outs<br>• Hitting |

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---Functional Behavior Assessment---

**Learner's Name:** _____     **Date/Time:** _____

**Observer(s):** _____

**Interfering Behavior:** _____

_____

**A-B-C Data Chart:**

In the table below, record your observations

|  | Setting | Antecedent | Behavior | Consequence |
|---|---|---|---|---|
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |
| Date:<br>Time: | | | | |

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---DR Frequency Data Collection---

Learner's Name: _____     Date/Time: _____

Observer(s): _____

Interfering Behavior(s): _____

_____

## Frequency Data:

Use frequency recording to collect data on every instance of the target behavior.

| Setting: | | | | | | | |
|---|---|---|---|---|---|---|---|
| Operational Definition of Interfering Behavior: | | | | | | | |
| Date | Start Time | Stop Time | Total Time | Tally | Total | Rate | Before, During, After (circle one) |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |
| | | | | | | | Before    During   After |

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---DR Duration Data Collection---

Learner's Name: _____     Date/Time: _____

Observer(s): _____

Interfering Behavior(s): _____

_____

## Duration Data:

Record each occurrence of target behavior and record start and end times.

| Setting: | | Activity: | | |
|---|---|---|---|---|
| **Operational Definition of Interfering Behavior:** | | | | |
| Date | Start Time | Stop Time | Total Duration | Before, During, After (circle one) |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |
| | | | | Before   During   After |

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---DR Partial Interval Data Collection---

Learner's Name: _____    Date/Time: _____

Observer(s): _____

Interfering Behavior(s): _____

_____

## Partial Interval Data:

Record when the interfering behavior occurs during an interval.

| Operational Definition of Interfering Behavior (IB): | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total Observation Time:** | | | | | | | | | **Length of Each Interval:** | | | |

| Date | Interval (+=IB occurs, 0=IB does not occur) | | | | | | | | | | % | Before, During, After (circle one) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |
|  |  |  |  |  |  |  |  |  |  |  |  | Before   During   After |

**For more information, visit:**
www.afirm.fpg.unc.edu

# Differential Reinforcement (DR)
## ---Professional's Guide---

## Differential Reinforcement...

- is an evidence-based practice for children and youth with autism spectrum disorder (ASD) from 3-22 years old that can be implemented in multiple settings.
- can be used by teachers and team members (paraprofessionals, speech pathologists, parents) in school, community, and home environments.

## Why Use?

- Differential reinforcement decreases interfering or challenging behaviors
- Differential reinforcement reinforcers learners for not engaging in the interfering behavior (DRO), spending less time engaged in the interfering behavior (DRL), and/or spending time engaged in more appropriate behavior choices (DRA/DRI).

## Outcomes

- The evidence – base for differential reinforcement supports the use of this practice to address the outcomes below:



## TIPS:

- Collect data on the interfering behavior and establish performance criteria
- Choose a differential reinforcement procedure appropriate for both the learner and the behavior
- Reinforce the learner consistently, following the schedule of reinforcement

| Early Intervention (0-2) | Preschool (3-5) | Elementary (6-11) | Middle (12-14) | High (15-22) |
|---|---|---|---|---|
| No Studies | Social | Social | Social | |
| | | Communication | Communication | |
| | Behavior | Behavior | Behavior | Behavior |
| | | Joint Attention | Joint Attention | |
| | | Play | | |
| | School Readiness | School Readiness | School Readiness | |
| | | Academic | | |
| | | | Motor | |
| | | Adaptive | | Adaptive |

# Differential Reinforcement (DR)
## ---Professional's Guide---

## Differential Reinforcement

This tip sheet was designed as a supplemental resource to help provide basic information about the practice.

**For more information, visit:** www.afirm.fpg.unc.edu

AFIRM Autism Focused Intervention Resources & Modules

## STEPS FOR IMPLEMENTING

### 1. Plan

o Identify and define interfering behavior through an FBA
o Select a differential reinforcement strategy
- If using DRI, also select incompatible behavior
- If using DRA, also select alternative behavior
o Collect baseline data on interfering behavior
o Identify Reinforcers
o Determine schedule of reinforcement
o Prepare materials

### 2. Use

o Meet with the learner
o Follow reinforcement schedule
o Generalize selected DR strategy to other settings and times of day

### 3. Monitor

o Collect data on target behaviors
o Thin reinforcement schedule based on performance criteria
o Determine next steps based on learner progress

# Differential Reinforcement (DR)
## ---Parent's Guide---
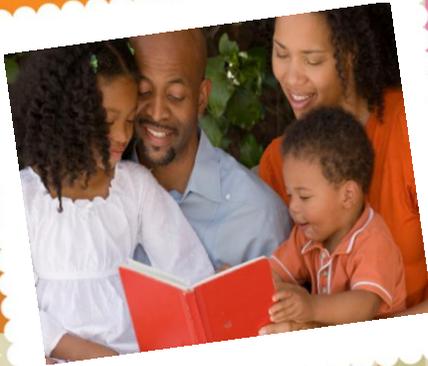
This parent introduction to **DR** was designed as
a supplemental resource
to help answer basic questions about
this practice.

To find out more about how **DR** is used with your child, speak with:

_____

**For more information visit:**
www.afirm.fpg.unc.edu

This introduction provides basic information about DR

## What is DR?
- Differential reinforcement is an evidence-based practice for children and youth with autism spectrum disorder (ASD) from 3 to 22 years old.
- Differential reinforcement is a practice used to help decrease challenging behaviors that interfere with learning and daily functioning.

## Why use DR with my child?
- Differential reinforcement is needed when a challenging behavior regularly interferes with your child's safety, the safety of others, and the learning process.
- Research studies have shown that differential reinforcement has been used effectively with learners in preschool, elementary school, middle school, and high school to address behavior, social, school readiness, academic, adaptive, communication, joint attention, play, and motor outcomes.

## What activities can I do at home?
- Notice when your child has a challenging behavior. Think about what happened before or after the behavior and share your notes and observations with your IEP team. This will help the team develop possible reasons for the purpose of the behavior and help choose a differential reinforcement strategy.

- Create a list of favorite activities or objects to be possible reinforcers that can be used at home or in school.

- If the same challenging behavior is happening at home and school, use the same differential reinforcement strategy in both settings.

# ---Additional Resources---

### Articles:

Jessel, J., Ingvarsson, E. T., Whipple, R., & Kirk, H. (2017). Increasing on-task behavior of an adolescent with autism using momentary differential reinforcement. *Behavioral Interventions, 32,* 248–254.

LeGray, M. W., Dufrene, B. A., Mercer, S., Olmi, D. J., & Sterling, H. (2013). Differential reinforcement of alternative behavior in center-based classrooms: Evaluation of pre-teaching the alternative behavior. *Journal of Behavioral Education*, *22*(2), 85–102.

Nuernberger, J. E., Vargo, K. K., & Ringdahl, J. E. (2013). An application of differential reinforcement of other behavior and self-monitoring to address repetitive behavior. *Journal of Developmental and Physical Disabilities*, *25*(1), 105–117.

### Apps:

*Autism Tracker Pro: Track and Analyze ASD* by Track & Share Apps, LLC ($9.99)

*Behavior Tracker Pro* by Marz Consulting Inc. ($29.99)

*Nulite Behavior Tracker for Special Education* by Stephen Mpy ($19.99)

---

AFIRM

**Autism Focused Intervention Resources & Modules**

Check out these resources to support your use of differential reinforcement.

**For more information visit:**
www.afirm.fpg.unc.edu

# Differential Reinforcement
## CEC Standards

The CEC Standards that apply to all 27 evidence-based practices can be found on our website at: http://afirm.fpg.unc.edu/learn-afirm

Below are CEC Standards that apply specifically to Differential Reinforcement (DR) module.

| Standard | Description |
|---|---|
| **Initial Preparation Standard 2: Learning Environments** | |
| ISCI 2  S2 | Identify realistic expectations for personal and social behavior in various settings |
| ISCI 2  S5 | Modify the learning environment to manage behaviors |
| ISCI 2  S10 | Use effective and varied behavior management strategies |
| ISCI 2  S11 | Use the least intensive behavior management strategy consistent with the needs of the individual with exceptionalities |
| **Initial Preparation Standard 4: Assessment** | |
| DDA84  S3 | Conduct functional behavior assessments that lead to development of behavior support plans |

| Standard | Description |
|---|---|
| **Advanced Preparation Standard 1: Assessment** | |
| SEDAS1.S8 | Conduct functional behavioral assessments (FBA) to determine what initiates and maintains a challenging/interfering behavior |

**For more information, visit:**
www.afirm.fpg.unc.edu

# ---Module References---

1.  Alberto, P., & Troutman, A. C. (2013). *Applied behavior analysis for teachers*. Boston: Pearson.
2.  Adelinis, J. D., Piazza, C. C., & Goh, H. L. (2001). Treatment of multiply controlled destructive behavior with food reinforcement. *Journal of Applied Behavior Analysis, 34*(1), 97-100. doi: 10.1901/jaba.2001.34-97
3.  Charlop-Christy, M. H., & Haymes, L. K. (1996). Using obsessions as reinforcers with and without mild reductive procedures to decrease inappropriate behaviors of children with autism. *Journal of Autism and Developmental Disorders, 26*(5), 527-546. doi: 10.1007/BF02172274
4.  Egan, P. J., Zlomke, L. C., & Bush, B. R. (1993). Utilizing functional assessment, behavioral consultation and videotape review of treatment to reduce aggression: A case study. *Special Services in the Schools, 7*(1), 27-37. doi: 10.1300/J008v07n01_02
5.  Hammond, J. L., Iwata, B. A., Fritz, J. N., & Dempsey, C. M. (2011). Evaluation of fixed momentary DRO schedules under signaled and unsignaled arrangements. *Journal of Applied Behavior Analysis, 44*(1), 69-81. doi: 10.1901/jaba.2011.44-69
6.  Healey, J. J., Ahearn, W. H., Graff, R. B., & Libby, M. E. (2001). Extended analysis and treatment of self-injurious behavior. *Behavioral Interventions, 16*(3), 181-195. doi: 10.1002/bin.91
7.  Kerth, D. M., Progar, P. R., & Morales, S. (2009). The effects of non-contingent self-restraint on self-injury. *Journal of Applied Research in Intellectual Disabilities, 22*(2), 187-193. doi: 10.1111/j.1468-3148.2008.00487.x
8.  Marcus, B. A., & Vollmer, T. R. (1996). Combining noncontingent reinforcement and differential reinforcement schedules as treatment for aberrant behavior. *Journal of Applied Behavior Analysis, 29*(1), 43-51. doi: 10.1901/jaba.1996.29-43
9.  Patel, M. R., Carr, J. E., Kim, C., Robles, A., & Eastridge, D. (2000). Functional analysis of aberrant behavior maintained by automatic reinforcement: Assessments of specific sensory reinforcers. *Research in Developmental Disabilities, 21*(5), 393-407. doi: 10.1016/S0891-4222(00)00051-2
10. Piazza, C. C., Moes, D. R., & Fisher, W. W. (1996). Differential reinforcement of alternative behavior and demand fading in the treatment of escape-maintained destructive behavior. *Journal of Applied Behavior Analysis, 29*(4), 569-572. doi: 10.1901/jaba.1996.29-569
11. Reed, G. K., Ringdahl, J. E., Wacker, D. P., Barretto, A., & Andelman, M. S. (2005). The effects of fixed-time and contingent schedules of negative reinforcement on compliance and aberrant behavior. *Research in Developmental Disabilities, 26*(3), 281-295. doi: 10.1016/j.ridd.2004.01.004
12. Tiger, J. H., Fisher, W. W., & Bouxsein, K. J. (2009). Therapist- and self-monitored DRO contingencies as a treatment for the self-injurious skin picking of a young man with Asperger syndrome. *Journal of Applied Behavior Analysis, 42*(2), 315-319. doi: 10.1901/jaba.2009.42-315
13. Newman, B., Tuntigina, L., Ryan, C.S., & Reinecke, D.R. (1997). Self-management of a DRO procedure by three students with autism. *Behavioral Intervention, 12*, 149–156.
14. Call, N. A., Pabico, R. S., Findley, A. J., & Valentino, A. L. (2011). Differential reinforcement with and without blocking as treatment for elopement. *Journal of Applied Behavior Analysis, 44*(4), 903-907. doi: 10.1901/jaba.2011.44-903
15. Bergstrom, R., Tarbox, J., & Gutshall, K. A. (2011). Behavioral intervention for domestic pet mistreatment in a young child with autism. *Research in Autism Spectrum Disorders, 5*(1), 218-221. doi: 10.1016/j.rasd.2010.04.002

# ---Module References---

16. Hagopian, L. P., Kuhn, D. E., & Strother, G. E. (2009). Targeting social skills deficits in an adolescent with pervasive developmental disorder. *Journal of Applied Behavior Analysis, 42*(4), 907. doi: 10.1901/jaba.2009.42-907

17. Thompson, M. J., McLaughlin, T. F., & Derby, K. M. (2011). The use of differential reinforcement to decrease the inappropriate verbalizations of a nine-year-old girl with autism. *Electronic Journal of Research in Educational Psychology, 9*(1), 183-196.

18. Lee, R., McComas, J. J., & Jawor, J. (2002). The effects of differential and lag reinforcement schedules on varied verbal responding by individuals with autism. *Journal of Applied Behavior Analysis, 35*(4), 391-402. doi: 10.1901/jaba.2002.35-391

19. Napolitano, D. A., Smith, T., Zarcone, J. R., Goodkin, K., & McAdam, D. B. (2010). Increasing response diversity in children with autism. *Journal of Applied Behavior Analysis, 43*(2), 265-271. doi: 10.1901/jaba.2010.43-265

20. Kelley, M. E., Shamlian, K., Lomas, J. E., & Pabico, R. S. (2011). Pre-assessment exposure to schedule-correlated stimuli affects choice responding for tasks. *Research in Developmental Disabilities, 32*(2), 527-531. doi: 10.1016/j.ridd.2010.12.029

21. Shabani, D. B., & Fisher, W. W. (2006). Stimulus fading and differential reinforcement for the treatment of needle phobia in a youth with autism. *Journal of Applied Behavior Analysis, 39*(4), 449-452. doi: 10.1901/jaba.2006.30-05

22. Pelios, L. V., MacDuff, G. S., & Axelrod, S. (2003). The effects of a treatment package in establishing independent academic work skills in children with autism. *Education and Treatment of Children, 26*(1), 1-21.

23. Buckley, S. D., & Newchok, D. K. (2005). An evaluation of simultaneous presentation and differential reinforcement with response cost to reduce packing. *Journal of Applied Behavior Analysis, 38*(3), 405-409. doi: 10.1901/jaba.2005.71-04

24. Buckley, S. D., Strunck, P. G., & Newchok, D. K. (2005). A comparison of two multicomponent procedures to increase food consumption. *Behavioral Interventions, 20*(2), 139-146. doi: 10.1002/bin.188

25. Rozenblat, E., Brown, J. L., Brown, A. K., Reeve, S. A., & Reeve, K. F. (2009). Effects of adjusting DRO schedules on the reduction of stereotypic vocalizations in children with autism. *Behavioral Interventions, 24*(1), 1-15. doi: 10.1002/bin.270

26. Taylor, B. A., Hoch, H., & Weissman, M. (2005). The analysis and treatment of vocal stereotypy in a child with autism. Behavioral Interventions, 20(4), 239-253. doi: 10.1002/bin.200

27. Wong, C., Odom, S. L., Hume, K. Cox, A. W., Fettig, A., Kucharczyk, S., Schultz, T. R. (2014). Evidence-based practices for children, youth, and young adults with autism spectrum disorder. Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence-Based Practice Review Group. http://autismpdc.fpg.unc.edu/sites/autismpdc.fpg.unc.edu/files/imce/documents/2014-EBP-Report.pdf

28. Athens, E. S., & Vollmer, T. R. (2010). An investigation of differential reinforcement of alternative behavior without extinction. *Journal of Applied Behavior Analysis, 43*(4), 569-589. doi:10.1901/jaba.2010.43-569