

Differential Reinforcement Schedules to Improve Classroom Behavior

Workshop F62

Partners in Learning Inc.

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Country Acres Private Preschool

Cherrywood Academy Preschool



Differential Reinforcement

- ❖ The implementation of **reinforcing** only the appropriate response (or behavior you wish to increase) and applying extinction to all other responses.
- ❖ Extinction is the discontinuing of a **reinforcement** of a previously reinforced behavior.

The Goal of Differential Reinforcement

- ❖ To increase desirable behaviors and decrease undesirable behaviors without the use of punishments.
- ❖ Uses **extinction**- i.e., the removal of the positive reinforcer that maintains the undesirable behavior.

Schedule of Reinforcement

- ❖ A rule describing a contingency of reinforcement
- ❖ A rule that states under what conditions a reinforcer will be delivered
- ❖ A rule describing how when and why reinforcement will be delivered

Types

- ❖ Differential Reinforcement of Other behavior (DRO)
- ❖ Differential Reinforcement of Alternative behavior (DRA)
- ❖ Differential Reinforcement of Incompatible behavior (DRI)

Also-

- ❖ Differential Reinforcement of Low Rates (DRL)
- ❖ Differential Reinforcement of High Rates (DRH)

These two schedules work along with other DR options and refer to the rates of behavior that are targeted for reinforcement

DRO: Differential Reinforcement of Other

- ❖ **The absence of the undesired behavior during a designated time period:** use this when there are high rates of a serious behavior and an alternative behavior is not observed.

- ❖ The reinforcer is given as long as the targeted inappropriate behavior does not occur or it is given in the absence of targeted behavior. This serves to directly decrease the inappropriate behavior

Differential Reinforcement of Other

- ❖ DRO involves delivering the reinforcer after an interval of time in which the problem behavior does not occur.
- ❖ The length of the interval for delivering the reinforcer should be tied to the baseline rate of the problem behavior:

- ❖ If the problem behavior occurs frequently, the DRO interval will be short;
- ❖ If the problem behavior occurs infrequently, the DRO interval will be longer.
- ❖ As the frequency of the problem behavior decreases, the DRO intervals can be lengthened gradually.

DRA: Differential Reinforcement of Alternative/Appropriate Behavior

- ❖ **The substitution of a more appropriate behavior in place of the inappropriate one**
- ❖ May involve teaching alternate responses prior to implementing the schedule

- ❖ Use this procedure if a replacement behavior is sometimes observed and the behavior is not serious enough that if you put it on extinction, the extinction burst will result in harm to the child

Differential Reinforcement of Alternative/Appropriate Behavior

- ❖ This intervention serves to increase the appropriate behavior while decreasing the inappropriate behavior.
- ❖ Functional Communication Training (FCT) is one type of DRA intervention.
- ❖ DRA interventions are often used to teach replacement behaviors for challenging behaviors.

DRI: Differential Reinforcement of Incompatible Behavior

- ❖ **The promotion of a more appropriate behavior that will actually prevent the occurrence of the inappropriate one (DRI):**

Differential Reinforcement of Incompatible Behavior

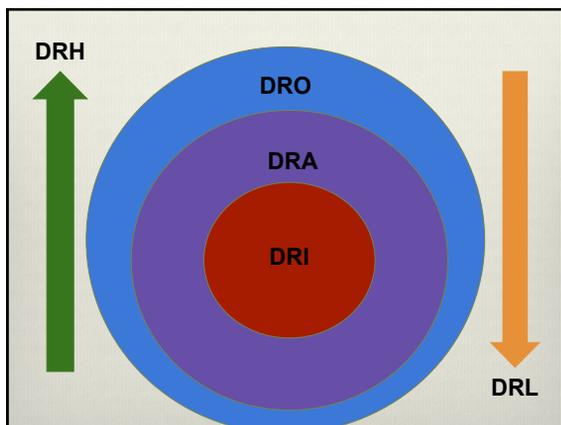
- ❖ This intervention differs from DRA because the new behavior is incompatible with the inappropriate behavior.
- ❖ For example, a student will receive reinforcement for sitting appropriately. Sitting is incompatible with running because the two cannot occur at the same time. Increasing sitting behavior will result in a decrease in running behavior

DRL:(Differential Reinforcement of Low Rates of Behavior)

- ❖ **The decrease in frequency of an inappropriate behavior:** use this procedure when you do not want to get rid of the behavior all together
- ❖ The reinforcer is delivered when the rate of the problem behavior is decreased to a criterion level. In the DRL procedure, a lower rate of the problem behavior is reinforced.

DRH:Differential Reinforcement of Higher Rates of Behavior

- ❖ **In this intervention, the reinforcer is given when the behavior occurs at a higher rate than before.** This intervention serves to increase desirable behaviors which decrease the amount of time available for inappropriate behaviors.



Country Acres Private Preschool

- ❖ Inclusive classroom
- ❖ 2 teachers & 1 BCBA
- ❖ 22 students
 - ❖ 11 nursery students
 - ❖ 2.5-3.5 years old
 - ❖ 11 preschool students
 - ❖ 3.5-5 years old

Differential Reinforcement Schedule

- Differential Reinforcement of High Rates of Behavior (DRH)
- Differential Reinforcement of Alternative Behaviors (DRA)
- Differential Reinforcement of Other Behaviors (DRO)

R.A.

- 3 years 6 months
- ASD
- VB-MAPP Milestone Assessment- Significant deficits in levels 2 & 3
- Purpose of this study is to increase social initiations

Interfering Behaviors

- ❖ Interfering behaviors continuously being tracked:
 - ❖ Stereotypical Behavior
 - ❖ Non-Compliance
 - ❖ Crying
- ❖ DRO implemented in the form of a 5 point token economy

Operational Definitions

- ❖ Independent Initiations: Any verbal interaction started by R.A. to a person without verbal, visual, or physical prompting from a third person.
- ❖ Prompt: Any extra verbal, visual, &/or physical cues, excluding the S^D, provided by a teacher or aide that results in R.A. initiating a verbal interaction with someone.
- ❖ Scheduled Initiations: The verbal initiation made by R.A. to the person on the cue card/clip within 5 seconds of viewing the S^D that did not require a prompt.

Method

- ❖ Single subject study
- ❖ Changing criterion design
- ❖ NCR & DRH/DRA
- ❖ Mastery of treatment phases
 - ❖ Mean of 90% or higher for scheduled initiations over 4 consecutive sessions

Materials

- ❖ Social initiation cards
- ❖ iPad
- ❖ Computer
- ❖ Peers
- ❖ Measurement
 - ❖ Paper & pencil
 - ❖ Frequency at which target behaviors occur during each interval
 - ❖ Whole interval recording
 - ❖ Independent initiations & scheduled initiations
 - ❖ Partial interval recording
 - ❖ Prompt

Procedure: Baseline

- ❖ No social initiation card cues were provided
- ❖ Observed during specific classroom activities
- ❖ Prompts provided during natural opportunities
- ❖ No reinforcement was delivered for target behaviors
- ❖ DRO remained in place

Procedure: Treatment Phase

1

- ❖ "+" was marked for scheduled initiation if R.A. performed the social interaction within 5 sec of the S^D
- ❖ "-" was marked if R.A. did not perform the scheduled initiation within 5 seconds and a prompt was immediately delivered
- ❖ "+" was marked for independent initiations if R.A. initiated with a peer outside of the S^D
- ❖ DRO in place throughout all phases of the study

Procedure: Treatment Phase

2

- ❖ Data collection remains the same through all phases of treatment
- ❖ NCR consisted of social initiations with peers

Teaching Procedure

- ❖ 2 exchanges with peers
- ❖ R.A. watched social initiation video for 3 consecutive sessions
 - ❖ 3-4 times per session
- ❖ No target behavior demands were placed on R.A. during teaching phase

Procedure: Treatment Phase

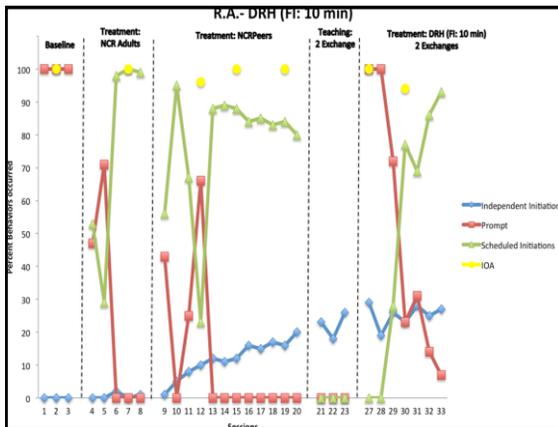
3

- ❖ Video alarm on iPad
- ❖ DRH- FI: 10 minutes
- ❖ Data collection remained the same
- ❖ When R.A. performed a scheduled initiation or an independent initiation the behavior was immediately reinforced and timer was reset

Procedure: Treatment Phase

3

- ❖ Aide provided R.A. with a verbal "no" & showed S^D again if she did not perform the initiation within 5 seconds
- ❖ If R.A. still did not perform the initiation, the aide did the same procedure as above, but also provided a verbal prompt
- ❖ No reinforcement was provided for a prompt



Results & Discussion

- ❖ Results
 - ❖ In all phases of the study, prompts decrease & social initiations increase
 - ❖ Starting in phase 2, R.A. started to independently initiate to peers & adults
 - ❖ R.A. started to apply the skills learned to different environments

Results and Discussion

- ❖ Study Extensions
 - ❖ Increase the number of initiations to a variety of peers made per interval
 - ❖ Increase number of contextual exchanges

Differential Reinforcement Schedules

- Differential Reinforcement of Low Rates of Behavior (DRL)
- Differential Reinforcement of Incompatible Behaviors (DRI)
- Differential Reinforcement of Other Behaviors (DRO)

O.Z.

- 3 years 5 months
- ASD
- VB-MAPP Milestone Assessment- Significant deficits in all 3 levels
- Purpose of this study is to decrease aggression and flopping behaviors

Interfering Behaviors

- ❖ Interfering behaviors continuously being tracked:
 - ❖ Stereotypical Behavior
 - ❖ Aggression
 - ❖ Flopping
 - ❖ Crying
- ❖ DRO implemented in the form of a 2 point token economy

Operational Definitions

- ❖ Aggression/Damage: Any attempt or occurrence of aggressive behavior towards others including, but not limited to hitting, kicking, scratching, throwing objects, biting, and/or destroying materials
- ❖ Flopping: Throwing or attempt to throw his own body to the ground, not including sitting, without being told to do so by the teacher

Method

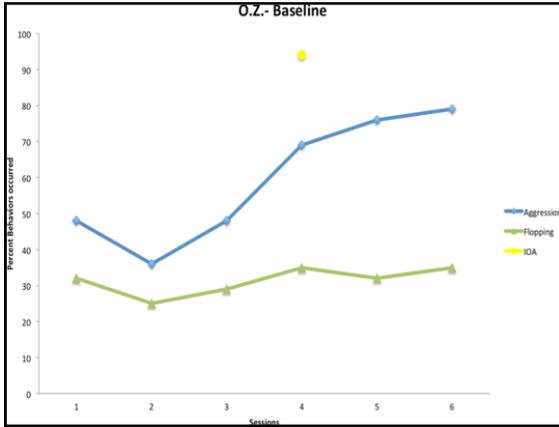
- ❖ Single subject design
- ❖ Multiple baseline across behaviors
- ❖ DRL/DRI
- ❖ Next treatment phase introduced when the mean of successful intervals are 90% or higher for 4 consecutive sessions

Materials

- ❖ iPad
- ❖ Timer
- ❖ Measurement
 - ❖ Paper & pencil
 - ❖ Frequency at which target behaviors occur during each interval
 - ❖ Partial interval recording
 - ❖ Aggression & Flopping

Procedure: Baseline

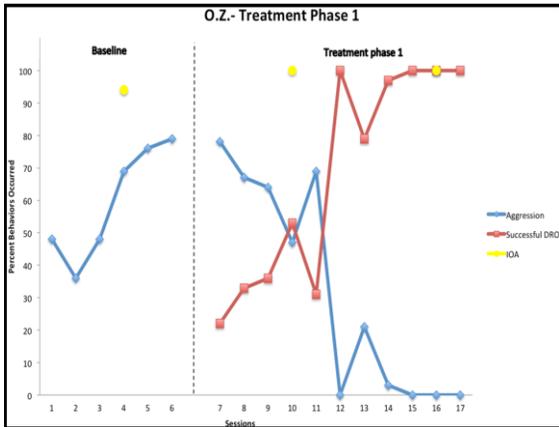
- ❖ No verbal attention (reprimand) given for the presence of target behaviors
- ❖ Compliance through redirection
- ❖ 2 point token economy in place throughout all phases of the study



Procedure: Treatment Phase 1

1

- ❖ DRL (FI: 5 min)
- ❖ Tracked Aggression
- ❖ "+" was marked in aggression column if the behavior occurred
 - ❖ Reset timer & new interval started
 - ❖ No access to reinforcement
- ❖ "+" was marked in successful interval column if no aggression occurred
 - ❖ O.Z. gained immediate access to reinforcement after a successful interval



Procedure: Treatment Phase 2

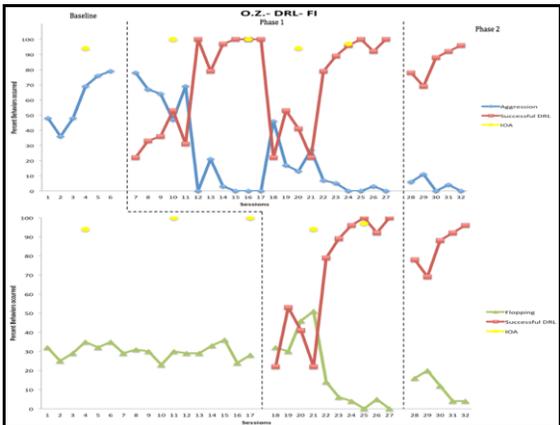
2

- ❖ DRL (FI: 5 min)
- ❖ Data collection remains the same through all phases of treatment
- ❖ Tracking aggression & flopping
- ❖ Mastery remains the same

Procedure: Treatment Phase 3

3

- ❖ DRL (FI: 10 min)
- ❖ Target behaviors remain the same
- ❖ Data collection remains the same through all phases of treatment
- ❖ Mastery remains the same
- ❖ DRO remains in place



Results & Discussion

- ❖ Results
 - ❖ Aggression decreased from about 80% to less than 10%
 - ❖ Flopping decreased from about 35% to less than 10%
 - ❖ Extinction burst in aggression when flopping added to DRL
- ❖ Discussion
 - ❖ Does decrease in aggression & flopping in school generalize to home

Differential Reinforcement Schedule

- Differential Reinforcement of Low Rates of Behavior (DRL)
- Differential Reinforcement of Incompatible Behaviors (DRI)
- Differential Reinforcement of Other Behavior (DRO)
- Differential Reinforcement of Alternative Behaviors (DRA)
- Fading Procedures

B.C.

- ❖ 6 years old
- ❖ ASD
- ❖ VB-MAPP Milestone Assessment: Gaps in level 3 mand & social
- ❖ Purpose of this study is to decrease stereotypical behavior

Interfering Behaviors

- ❖ Interfering behaviors continuously being tracked:
 - ❖ Crying
 - ❖ Non-compliance
 - ❖ Stereotypical
- ❖ DRO implemented in the form of a 5 point token economy

Operational Definition

- ❖ **Stereotypical:** any repetitive and/or non-contextual behavior requiring redirection.

Method

- ❖ Single subject design
- ❖ Changing criterion
- ❖ DRL/DRI with response cost
- ❖ Next treatment phase introduced when independently completing the DRI 85% of the time or higher for two consecutive sessions

Materials

- ❖ Timers
- ❖ iPad
- ❖ PRIZE point card
- ❖ Prize bag

- ❖ Measurement
 - ❖ Paper & pencil
 - ❖ Frequency at which target behavior occurred during each interval
 - ❖ Whole interval recording for successful DRI
 - ❖ Partial interval recording for stereotypy

Procedure: Baseline

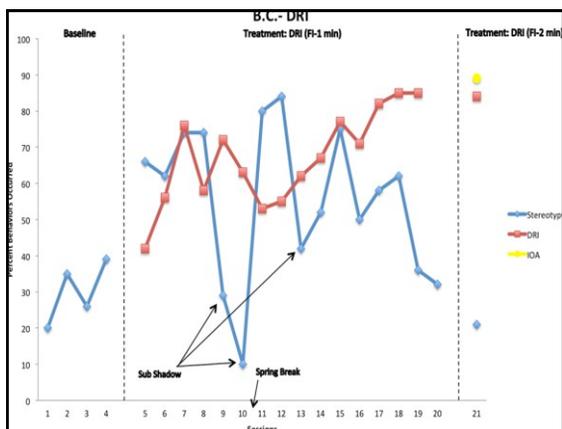
- ❖ No verbal attention (reprimand) given for the presence of target behavior
- ❖ Compliance through redirection
- ❖ DRO and NCR remained in place throughout all phases of the study

Procedure: Treatment

- ❖ DRL- FI: 1 minute
- ❖ "+" was marked in stereotypical behavior column if the behavior occurred
 - ❖ Reset timer, prize point is removed & new interval started
 - ❖ No access to reinforcement
- ❖ "+" was marked in successful interval column if target behavior did not occur
 - ❖ B.C. gained immediate access to reinforcement after a successful interval

Procedure: Treatment

- ❖ Data collection remained the same throughout all phases of the study
- ❖ The fixed interval time increased with each phase
- ❖ Delayed reinforcement increased with each phase
 - ❖ increased the amount of letters needed to gain access to reinforcement
 - ❖ Successful interval 1: P
 - ❖ Successful interval 2: R
 - ❖ Continue until the word PRIZE is spelled



Results & Discussion

- ❖ B.C. demonstrated high levels of stereotypical behavior during baseline
- ❖ S levels increased when DR schedule was implemented, but the behavior topography changed to being more subtle and there was a decrease in duration of the behavior

Differential Reinforcement Schedule

- Differential Reinforcement of Low Rates of Behavior (DRL)
- Differential Reinforcement of Alternative Behaviors (DRA)
- Advanced interactions

L.C.

- ❖ 5 years old
- ❖ ASD
- ❖ VB-MAPP Milestone Assessment: Gaps in level 3 mand, social, & play
- ❖ Purpose of this study is to decrease inappropriate verbalizations

Interfering Behaviors

- ❖ Interfering behaviors continuously being tracked:
 - ❖ non-compliance
 - ❖ crying
 - ❖ stereotypical
 - ❖ inappropriate verbalizations
 - ❖ aggression
 - ❖ aggression to peers
- ❖ DRO implemented in the form of a 10 point token economy

Operational Definition

- ❖ Inappropriate Verbalizations: Any non-contextual verbalizations and/or repetitive statements at or below conversation level. This includes self-talk at any volume
 - ❖ E.g. "I'm talking loud today", "Are you the teacher?"

Method

- ❖ Single subject design
- ❖ Changing criterion with a reversal
- ❖ DRL/DRA
- ❖ Next treatment phase introduced when independently completing the DRA 90% of the time or higher for two consecutive sessions

Materials

- ❖ Social Cards
- ❖ iPad
- ❖ Measurement
 - ❖ Paper & pencil
 - ❖ Frequency at which target behavior occurred during each interval
 - ❖ Partial interval recording

Procedure: Baseline

- ❖ No verbal attention (reprimand) given for the presence of target behavior
- ❖ Compliance through redirection
- ❖ DRO remained in place throughout all phases of the study

Procedure: Treatment

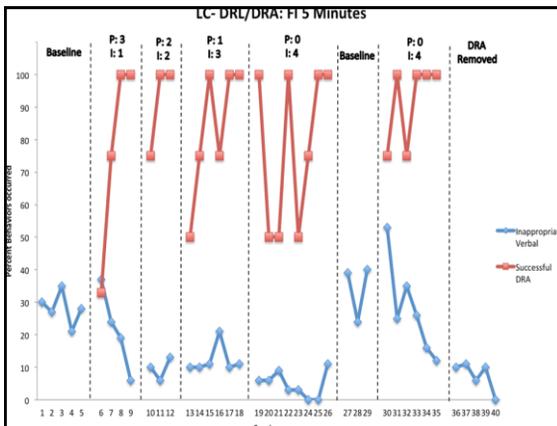
- ❖ DRL- FI: 5 minutes
- ❖ "+" was marked in inappropriate verbalization column if the behavior occurred
 - ❖ Reset timer & new interval started
 - ❖ No access to reinforcement
- ❖ "+" was marked in successful interval column if target behavior did not occur
 - ❖ L.C. gained immediate access to reinforcement after a successful interval

Procedure: Treatment

- ❖ DRL/DRA- FI: 5 minutes
 - ❖ 4 exchanges each interval
 - ❖ DRA embedded in iPad schedule

Procedure: Treatment

- ❖ Predetermined number of independent & prompted social interactions per phase
 - ❖ prompted social interactions decreased with each phase
 - ❖ DRA removed in final phase
 - ❖ prompted social interaction on iPad



Results & Discussion

- ❖ Decreased rates of inappropriate verbalizations in all treatment phases
- ❖ Inappropriate vocalizations continue to decrease when DRL/DRA removed

Differential Reinforcement Schedules

- Whole group:
 - Differential Reinforcement of Incompatible Behaviors
- Individual:
 - Differential Reinforcement of Incompatible Behaviors (DRI)
 - Differential Reinforcement of Other Behaviors (DRO)

Class Dynamic

- ❖ Whole Group: 15 preschool students
 - ❖ 3.5 – 5 years old
 - ❖ 7 boys; 8 girls
 - ❖ First time in a school setting for 5 students
- ❖ Individual: 3 students
 - ❖ All students new to the school settings
 - ❖ M.D. is a 4 year old girl
 - ❖ R.T. is a 3.5 year old boy
 - ❖ C.T. is a 3.5 year old boy

Operational Definitions

- ❖ Disruption: Talking and/or screaming without being prompted to do so by the teacher when less than 1/3 of the class is talking and/or screaming
- ❖ Wandering: The child walking more than 4 feet away from his/her peers without being prompted to do so by the teacher.
- ❖ Independent: The absence of crying, disruption, & wandering throughout the whole interval and the teacher does not give the child any extra directions that she did not give to less than 1/3 of the class

Method & Materials

- ❖ Alternating treatment design
- ❖ DRI
- ❖ Measurement
 - ❖ Paper & pencil
 - ❖ Frequency at which target behaviors occur during each interval
 - ❖ Whole interval recording
 - ❖ Independent
 - ❖ Partial interval recording
 - ❖ Disruption & Wandering

Procedure: Baseline

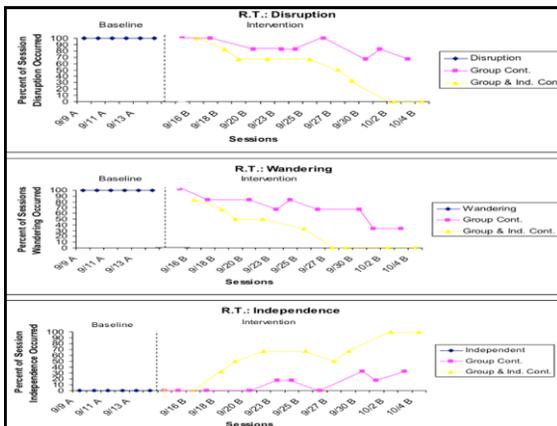
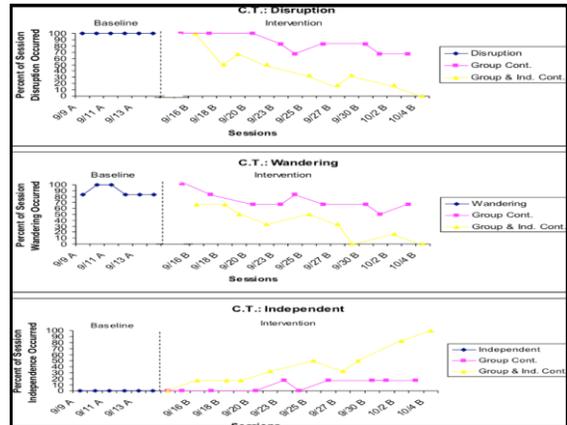
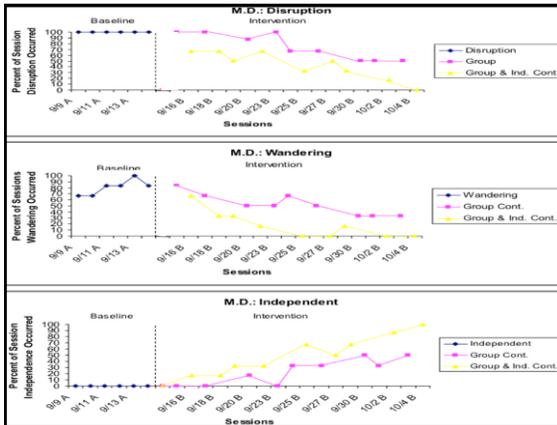
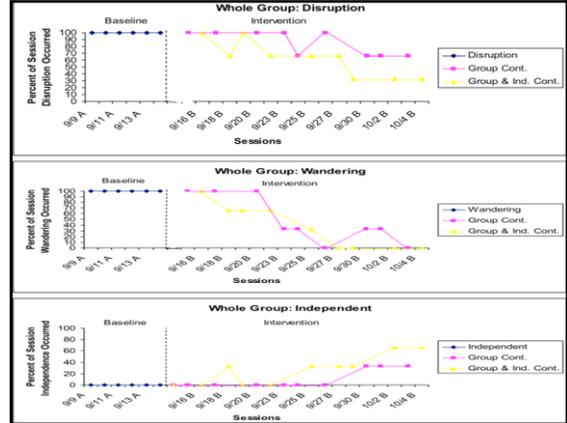
- ❖ No DR systems in place
- ❖ No reinforcement for independence
- ❖ Redirection for disruption & wandering

Procedure: Treatment Group DRI

- ❖ DRI: FI 8 minutes
- ❖ Independence:
 - ❖ "+" marked in independent column
 - ❖ The class picked a treat (e.g. 1 Skittle, 1 M&M, 1 Smarty)
- ❖ Disruption and/or Wandering:
 - ❖ "+" marked in the corresponding behavior's column
 - ❖ Timer was reset and the teacher reminded the students about the treats

Procedure: Treatment Individual DRI

- ❖ Timers set for 4 minutes
- ❖ Independence:
 - ❖ "+" marked in independent column
 - ❖ Student picked a treat (e.g. 1 Skittle, 1 M&M, 1 Smarty)
- ❖ Disruption and/or Wandering:
 - ❖ "+" marked in the corresponding behavior's column
 - ❖ Timer was reset and student does not gain access to reinforcement



Results & Discussion

- ❖ Whole group DRI decreased disruption & wandering & increased independence
- ❖ Whole group DRI paired with individual DRI, disruption & wandering decreased at a faster rate & occurred less and independence increased to a higher rate
- ❖ Whole group & individual contingencies can be faded by lengthening the time of the intervals & switching the reinforcement to social praise

Thank you to our children,
families, & staff for their
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