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Research Paper

# Efficacy of DRA in Reducing the Frequency of Hitting Behavior in a Child with Autism Spectrum Disorder: A Single Case Study

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## ABSTRACT

In the present study Differential Reinforcement of Alternative Behavior was implemented to reduce the hitting behavior of a child under Autism Spectrum Disorder. Autism not only leads to delays and issues in communication and socialization but also causes many behavioral challenges. It is common for a child under ASD to engage in aggressive behaviors towards themselves and others while expressing emotions. One such commonly observed behavior is Hitting. In the present study, the problem of hitting behavior was put on extinction on occurrence. Positive reinforcement was used for the alternative behavior of calling others instead of hitting. The DRA procedure along with positive reinforcement showed constant decrease in the frequency of target behavior.

***Keywords:*** *DRA, problem behavior, extinction, ignoring, Autism, positive reinforcement*

Human system is the most complex amongst all organisms. As social beings we live our lives in the company of other humans. Social adaptability is our unique character. To live effectively and efficiently in a social group we all abide by social rule. Any behavior that is inappropriate or challenging needs to be replaced by a socially accepted one.

Doss and Reichle (1991) in his research have defined challenging behavior as "Those behavior by a learner that results in self-injury, cause damage to physical environment, interferes with the acquisition of new skills, and/or socially isolates the learner". Autism spectrum disorder is a neurodevelopmental disorder characterized by persistent difficulties in social communication and social interaction, coupled with restricted, repetitive patterns of behavior or interest as defined in DSM- 5. In a study by Sarah et al. (2016), indicates that aggression rates may be higher in individuals with ASD as compared to those with other developmental disabilities. In addition to challenges caused by core symptoms of disorder, maladaptive behaviors such as aggression that are associated with ASD and can further disrupt functioning and quality of life of the individual as mentioned by Dawson et al.

A study by Brown et al. (2024) explains that aggressive behavior in autistic children and adolescents does not arise from a single cause, but from a combination of interacting factors. Their review shows that child-related characteristics such as sleep difficulties, repetitive

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behaviors, emotional regulation challenges, and co-occurring conditions like anxiety or ADHD are strongly linked to increased aggression. At the same time, environmental influences, including caregiver stress, family dynamics, and peer relationships also play an important role. The authors highlight that aggression in ASD should be understood within a biopsychosocial framework, where both individual vulnerabilities and contextual stressors contribute to behavioral outcomes. They emphasize the need for comprehensive assessment and interventions that address not only the child's needs but also family and environmental factors.

In a study by Baker et al. (2002) aggression and destructive behaviors can be the main causes of stress among parents of children with developmental disorders, particularly in ASD children. Many a times, aggression increases the risk of child being physically abused by caregivers, including parents and other people who live with the children was explained in a study by Kanne et al. (2011).

Applied Behavior Analysis has been very effective in reducing a wide range of socially unacceptable behaviors and replacing them by the socially acceptable ones. Iwata et al. (1997).

Differential Reinforcement of Alternative Behavior (DRA) is one of the principal tools used to bring about these improvements in behavior was explained in a study by Petscher et al. (2009).

The findings by Deitz & Repp, (1983) indicates that DRA involves withholding the reinforcers following the problem behavior and providing reinforcers for the socially acceptable behavior. Some of the researches in the past have shown that DRA can be less effective when trying to decrease a problem behavior If implanted without extinction. Volkert et al. (2009). Thus, this shows that use of extinction along with DRA is very important. At times it is difficult or unethical to allow extinction of unwanted behavior. Identification of the appropriate reinforcers that can maintain the problem behavior by functional analysis helps to plan for proper extinction procedures, which should by definition has to match the function of the problem behavior as explained by Iwata et al. (1994). Functional Analysis method helps to identify the variables that influence the occurrence of the problem behavior and has become a pioneer in behavioral assessment Hanley et al. (2003).

The present study was conducted to reduce the hitting behavior using along with extinction in a child with Autism. The procedure included to provide extinction to the problem behavior of hitting while reinforcing the desired alternative behavior of requesting for attention by calling out.

## METHOD

**Participant-** A is a 6.7 yrs. old girl diagnosed with Autism Spectrum Disorder duly diagnosed by a psychologist in India. On cars assessment the child has a score of 31, which suggests mild to moderate Autism. A has been in the therapy since the time she was diagnosed in various centers. Past 2 years she has been in intensive behavior therapy and speech stimulation for 2 hrs. per day at Total Solution Rehabilitation Society, Hyderabad. The overall assessment reveals that she has one-word speech. She can ask for help from

adults by asking or pointing for the desired wants. Informed consent was obtained from the parents before beginning the intervention.

***Material and Settings***

The setting for this study were therapy center and participants home. Data collection for baseline and application of the intervention were both done at home and at the center. The experimenter who implemented the procedures was the therapist working with the child. Reinforcers to reinforce the alternative behavior were selected periodically during every session. Reinforcers were chips, her favorite moving activity.

***Target Behaviour***

A detailed functional assessment was conducted using direction observation and also interviewing the parents before the study at the therapy center. Using functional analysis, the target behavior and its function were identified (Appendix C). Based on these the intervention plan was decided. A's target behavior was hitting. Her hitting behavior was defined as lifting her right hand and palm coming in contact with the other person with full pressure when a difficult task was presented to her. This behavior of A was selected for intervention as her behavior was interfering with her social communication learning, acceptance of challenging tasks, peer making and was also harmful to others. Her communication skills were one-word verbal expression which was decided after ABLL'S assessment was done with her.

ABBLS is The Assessment of Basic Language and Learning Skills ABLLS- R Protocol- An assessment, Curriculum Guide, and Skills Tracking System for Children with Autism or Other Developmental Disabilities by James W. Partington, Ph. D., BCBA. Following expression were taken as alternative behaviors to reinforce. The expressions were- 'stop', 'no', 'yes' for desired activity. For calling 'mom', 'maam'.

**DATA COLLECTION AND IOA (Inter-Observer Agreement)**

Frequency of the hitting behavior for baseline was collected throughout the day for 4 days. The intervention sessions were conducted at the therapy center. The child was being observed for weekly 6 session which were of 1 hr. each. For the intervention the data was collected during 15 min intervals. A whole interval recording was used for collecting the data. IOA was obtained for 50% of the sessions in each phase. A therapist previously trained was independently observing and collecting data. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements, multiplied by 100. (Refer Appendix B).

$$\text{IOA} = \frac{\text{Sum of Agree}}{\text{Sum of agree + sum of disagree}} * 100$$

***Design***

A single-case study using an AB design was employed, where A represents the baseline phase (data collected prior to intervention) and B represents the intervention phase (data collected after the implementation of the intervention). The dependent variable is child's hitting behavior and the independent variable is the DRA procedure. Procedures of extinction and Ignoring were used to reduce the problem behavior as it interfered with the social learning and communication and alternative the behavior of asking was

simultaneously reinforced. Reinforcers for the alternate behavior were identified through preference assessment which was regularly done during the sessions.

***Baseline***

For the data collection for baseline a detailed functional assessment was done. Interview was conducted with the parent at the therapy center. Based on the data reported by the parent intervention strategies were designed in which DRA along with extinction strategies were implemented to reduce the problem behavior of A. The data collected by directly observing the child in center was considered as baseline.

***Intervention***

After collecting the baseline data, based on that information intervention was planned. During the intervention phase DRA was used along with extinction. The alternative behavior that was to be reinforced was already decided and the therapist was aware about it. Through the clinical observation and behavioral assessment (ABLLS) it was observed that the child had single word speech, her vocabulary was limited to 50-70 words. For teaching her the alternative behavior of saying 'no' or 'stop' to change the difficult task or show gestures for the same, positive reinforcement along with shaping was used. At times when she failed to use alternative behavior, therapist used extinction for the target behavior. For generalization mother was given demonstrations about the intervention procedures on daily basis so she could apply the same at home.

***Generalization***

To generalize the child's behavior, opportunities were created for her to interact with her therapist and others. Easy to complex tasks were given to her by different therapists at the various other sessions the child attended at the center. These therapists were also trained, before help was taken for generalization. The same was also conducted by mother at the home setting for which she was priory trained.

## RESULTS

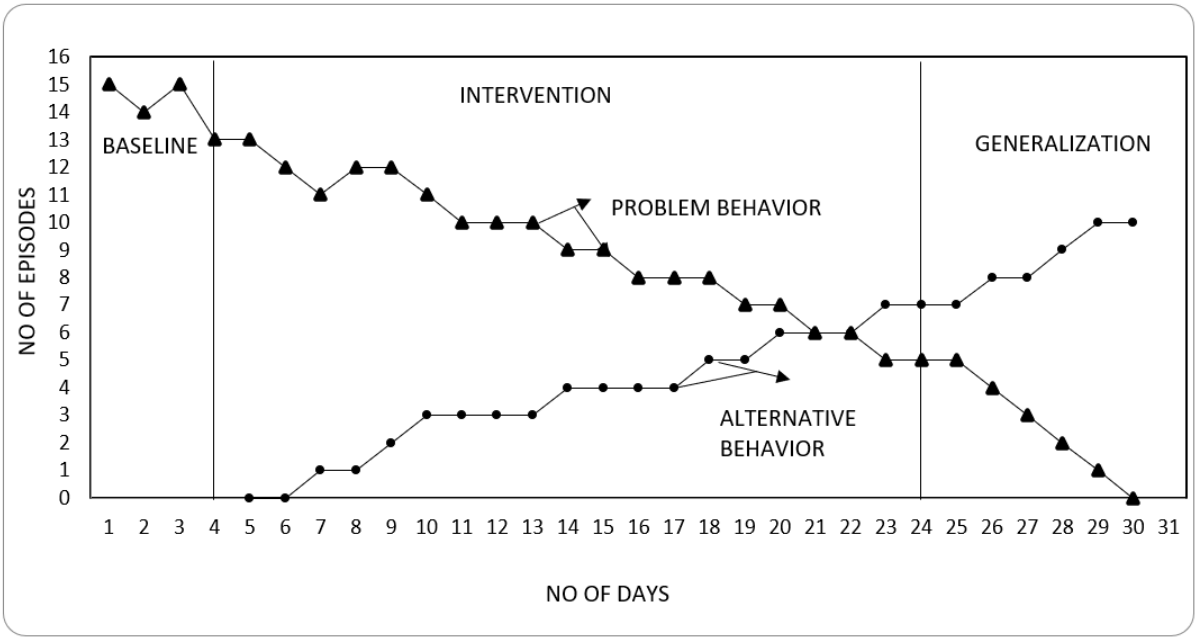
After the functional assessment which was conducted through interview and direct observation, it was observed that A was showing problem behavior of hitting whenever a difficult task was given to escape from it. The data was confirmed by observing the child for 4 days by the therapist to collect a baseline.

From ABBL'S assessment it was already known that the child had one-word communication skill where she could communicate and request the therapist to stop or change the activity. The data collected through the observation forms was considered as a baseline. Where it was seen that every time a difficult task was presented the child would hit. (Refer Appendix A - 1.1). The frequency of the child's hitting behavior was 15 times in a day.

For the intervention it was decided to put the problem behavior on extinction while simultaneously the alternative behavior of requesting to change activity or stop activity was reinforced. This intervention of reinforcing alternate behavior showed a difference where the hitting behavior decreased from 15 to zero level in 30 days. See (appendix A- 1.2)

For generalization probe mother and another therapist working with A, presented easy and difficult tasks to her which were on her IEP. It was seen that the problem behavior again

increased to 5 before going down to zero level. Simultaneously the verbal behavior of requesting had increased to 80-90% of the time. (Refer Appendix A- 1.3.)




## DISCUSSION

The purpose of this study was to decrease the hitting behavior of a child with Autism from escaping from a difficult task. The major findings of the present study showed that the behavioral problems could be decreased by using DRA along with extinction. The problem behavior of hitting decreased to zero level. It was observed that if functional assessment procedure is conducted in agreement with interventions that adhere to the principles of ABA then the challenging behaviors can be reduced.

The data obtained during baseline when compared with data after intervention, that the intervention procedures showed a positive change and reduction in the problem behavior. When the problem behavior of hitting was exposed to extinction while simultaneously the positive reinforcement was used for alternative behavior, the problem behavior decreased and verbal behavior increased.

For generalization and maintenance probe the same procedures were followed.The results of the study are similar with the findings of several other researches about the methods of reducing problem behaviors using DRA procedures. (Elizabeth S Athens and Timothy R.Vollmer, 2010).

### *Limitations*

There are limitations to this experiment. As it was a single case study the results could not be generalized. The ABLL'S assessment showed that the child has a one-word communication skills due to which it was not possible to understand and associate with each word. E.g. - if the child said "change" in-order to change a difficult task, the therapist would change the activity, but then which another task should she/he give or which other task could be the preferred task of the child, leaves us a scope for further training and research as, they are beyond the boundaries of this study.

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***Conflict of Interest***

The author(s) declared no conflict of interest.

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## APPENDIX A

***1. Observational Sheet Used in the Baseline***

| DAYS | HITTING BEHAVIOUR | DIFFICULT TASK | ESCAPE |
|---|---|---|---|
| 1 | 15 | 15 | 15 |
| 2 | 14 | 14 | 14 |
| 3 | 15 | 15 | 15 |
| 4 | 13 | 13 | 13 |

***2. Observational Sheet for Intervention***

| SESSIONS | HITTING BEHAVIOUR | DIFFICULT TASK | ESCAPE | ALTERNATIVE BEH OF SAYING CHANGE/NO |
|---|---|---|---|---|
| 1 | 13 | 13 | 13 | 0 |
| 2 | 12 | 12 | 12 | 0 |
| 3 | 11 | 11 | 11 | 1 |
| 4 | 12 | 12 | 12 | 1 |
| 5 | 12 | 12 | 12 | 2 |
| 6 | 11 | 11 | 11 | 3 |
| 7 | 10 | 10 | 10 | 3 |
| 8 | 10 | 10 | 10 | 3 |
| 9 | 10 | 10 | 10 | 3 |
| 10 | 9 | 9 | 9 | 4 |
| 11 | 9 | 9 | 9 | 4 |
| 12 | 8 | 8 | 8 | 4 |
| 13 | 8 | 8 | 8 | 4 |
| 14 | 8 | 8 | 8 | 5 |
| 15 | 7 | 7 | 7 | 5 |
| 16 | 7 | 7 | 7 | 6 |
| 17 | 6 | 6 | 6 | 6 |
| 18 | 6 | 6 | 6 | 6 |
| 19 | 5 | 5 | 5 | 7 |
| 20 | 5 | 5 | 5 | 7 |

***3. Observational Sheet for Generalization***

| SESSIONS | DIFFICULT TASK BY THERAPIST | DIFFICULT TASK BY MOM | ALTERNATIVE BEH OF SAYING CHANGE/NO |
|---|---|---|---|
| 1 | 5 | 4 | 7 |
| 2 | 4 | 4 | 8 |
| 3 | 4 | 5 | 8 |
| 4 | 3 | 3 | 9 |
| 5 | 2 | 2 | 10 |
| 6 | 3 | 3 | 10 |

## APPENDIX B

**IOA of Baseline**

| DAYS | OBSERVER 1 | OBSERVER 2 | AGREEMENT |
|---|---|---|---|
| 1 | 15 | 15 | √ |
| 2 | 14 | 14 | √ |
| 3 | 15 | 15 | √ |

Agreement = 100%

**IOA of Intervention**

| SESSION | OBSERVER1 | OBSERVER2 | AGREEMENT |
|---|---|---|---|
| 1 | 10 | 9 | X |
| 2 | 10 | 10 | √ |
| 3 | 8 | 8 | √ |
| 4 | 9 | 9 | √ |
| 5 | 9 | 8 | X |
| 6 | 8 | 8 | √ |
| 7 | 8 | 8 | √ |
| 8 | 8 | 8 | √ |
| 9 | 7 | 6 | X |
| 10 | 7 | 7 | √ |
| 11 | 7 | 7 | √ |
| 12 | 6 | 6 | √ |
| 13 | 6 | 6 | √ |
| 14 | 5 | 5 | √ |
| 15 | 5 | 5 | √ |
| | | | Agree= 12 |
| | | | Disagree= 3 |

TOTAL= AGREE / AGREE+DISAGREE *** 100 = 12**/12+3 *100 = 12 **/15 *100 = 0.8***100= 80%

**IOA of Generalization**

| SESSION | OBSERVER1 | OBSERVER2 | AGREEMENT |
|---|---|---|---|
| 1 | 5 | 5 | √ |
| 2 | 4 | 4 | √ |
| 3 | 3 | 2 | X |
| 4 | 1 | 1 | √ |
| 5 | 0 | 0 | √ |
| | | | Agree= 4 |
| | | | Disagree= 1 |

TOTAL = 4/4+1*100 **= 0.8***100= 80%

## APPENDIX C

**FBA SHEET (ASD) – HITTING**

- **Child:** Feale | **Age:** 6.7 years | **Diagnosis:** ASD
- **Setting:** Therapy room
- **Observer:** Therapist
- **Observation Period:** 5 days

**1) Target Behavior-**

- **Hitting-** The child lifts her right hand and makes contact using her palm on another person's body with full pressure.
- **Baseline Average:** 14 hits per day (mostly during table work)

**2) ABC Summary-**

| Activity/Task | Antecedent (What happened before?) | Behavior | Consequence (What happened after?) |
|---|---|---|---|
| Tracing | Teacher presents worksheet and says "Start" | Hits teacher | Work is paused, teacher steps back |
| Matching | Teacher says match it | Hits therapist | Break given (2–3 minutes) |
| Table work | Asked to continue after refusal | Hits adult | Demand removed temporarily |
| Transition to work | "Play finished, come sit" | Hits adult | Transition delayed |

**3) Common Triggers-**

When given difficult or non-preferred task.
Asked to repeated instruction ("Do again")
Transition from preferred → non-preferred activity
Longer sitting time.

**4) Identified Function of Behavior-**

Primary Function: Escape from Difficult Task
Hitting occurs to: Avoid, delay, or escape from challenging demands (writing, structured table tasks, correction).

**5) Hypothesis Statement**

When a difficult or non-preferred task is introduced or continued (especially table work and writing), the child hits by lifting her right hand and making full-pressure palm contact with another person in order to escape or delay the task.