

**Case Study: Application of Contingent Reinforcement Procedures on Disruptive
Classroom Behaviour**

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The purpose of this case study was to find out if an intervention based on contingent reinforcement procedures is useful as a tool to be adapted for dealing with disruptive classroom behavior. It also aimed to discover if such an intervention could be understood and applied easily by teachers in a secondary classroom setting. Through Functional Behavior Analysis, it was observed that when the teacher gives the class work to do, the participant indulges in off-task behavior in order to get the teacher's attention. The intervention was expected to decrease classroom disruptions or off-task behavior while increasing on-task behavior and work completion. The study was completed in three main phases of pre intervention, intervention, and post intervention in a total of 20 days utilizing an intervention package based on Conjoint Behavior Consultation (CBC) and contingent reinforcement. During the pre-intervention phase, a baseline for off-task disruptive behavior was established at an average frequency of 4.3 times to 0 times per 30 minute period. In the second phase of intervention, backup reinforcers along with social reinforcers were introduced, and made contingent upon on-task non-disruptive behavior. During intervention the average frequency of off-task disruptive behavior reduced from 4.3 times to 0 times which was maintained at almost the same level during the post intervention phase. This study has its implication on both the importance of contingent reinforcement procedures in the classroom, as well as the need for proper training for reinforcement procedures for teachers in the classroom environment.

Keywords: Applied behavior analysis, behavior modification, education, reinforcement, school.

A classroom is a place where learning can take place through effective teacher – student interaction. In the best interests of both the parties, it is better if this interaction takes place in a peaceful and cooperative manner. However, this is an ideal condition and additional factors related to either of the individuals or the environment can lead to disturbed communication. Classroom management is a skill that is taught in several classrooms worldwide, yet this does not guarantee positive results every time. According to Ingersoll and Smith (2003), this is a cause for concern for beginning teachers who leave teaching within the first year due to job dissatisfaction. Poor student motivation and student discipline problems were two main issues among four issues listed by a representative sample of these teachers.

Research literature indicates that teachers have reported behavior problems as one of their greatest classroom worries and challenges over the last twenty years (Billingsley & Tomchin, 1992; Billingsley, Carlson, & Klein, 2004; Boyer & Lee, 2001; Busch, Pederson, Espin, & Weissenburger, 2001; Fimian & Santoro, 1983; Griffin, Kilgore, Winn, Otis-Wilborn, Hou, & Garvan, 2006; Kilgore, Griffin, Otis-Wilborn & Winn, 2003; Otis-Wilborn, Winn, Griffin, & Kilgore, 2005; Veenman, 1984). These problematic behaviors of students are not only problematic for teachers who are trying to maintain classroom discipline, but they also interfere with the student's academic progress. Research shows that well-established patterns of disruptive behavior are predictive of poor academic engagement, lower grades, conduct problems, peer rejection, and high rates of school dropout (Algozzine, Serna, & Patton, 2001).

While disruptive behavior in itself is detrimental to the studious atmosphere of a classroom, it is the off-task disruptive behavior that has been found to be one of the most challenging and problematic behaviors of students in the classroom setting. A study by Book and Skeen (1987) based on observing the frequency of disruptive behaviors collected data that included 81 referred and 81 non referred students in a Utah suburb. The sample was diverse ranging from kindergarten through grade 5. It was discovered that referred students were more frequently 'off-task', 'talked out' more often, were more frequently 'out of seat,' and more often displayed 'other' disruptive behaviors. This feature implicitly points towards the implication of early identification of problem behaviors by the teacher and prompt referral of the same.

Applied Behavior Analysis (ABA) has given varied Behavioral Intervention Plans to modify inappropriate behavior in the classroom environment, and general research data

shows support for nearly all the listed interventions (Virginia Department of Education, 2009; Koffler, Rapport & Alderson, 2008). In ABA relations between environment and behavior are studied through the use of direct observation (of actions), measurement (frequency or duration), and functional analysis (antecedents and consequences). The ABA procedures include Functional Behavior Assessment, Behavior Intervention Plans, and forms of behavior therapy. These procedures can be applied to an individual as well as to groups. A few of the commonly used interventions of ABA include Conjoint Behavioral Consultation (CBC), Contingency management including contingent and non-contingent reinforcement procedures, and Token economy. To clarify further, Functional Behavior Assessment (FBA) procedures determine the underlying cause of those behaviors that hamper learning of the student or create hurdles in the learning of the student's peers.

On the other hand, a Behavior Intervention Plan (BIP), is a plan that utilizes behavioral interventions to decrease those behaviors that interfere with a student's academic progress and/or increase the behaviors that lead to improved learning for that student.

Usually an FBA is carried out at a preliminary stage in order to gather information on challenging student behaviors and this record is then used to develop the BIP. Other procedures mentioned above are parts or variations of the BIP including but not limited to CBC and Token Economy among others. Contingency management on the whole describes the operant conditioning process whereby reinforcement is used as a medium for behavior modification based on a system of cause-effect of behavior. The respective student on whom the procedure is applied is expected to eventually respond to the ingrained idea that every action will be preceded by and in turn be dependent or contingent on yet another in the environment - the consequences of the action.

The problem of the study was to find out if contingent reinforcement could be used with disruptive behavior in the classroom setting and if teachers were able to understand this process. The participant chosen for the study did not maintain on-task non-disruptive behavior and disrupted the class by poking and talking to other students during tasks. As a result, she received negative attention from the complaints of students, as well as the teachers who used verbal and social punishers (scolding and standing in class or removal from the class) to deal with her maladaptive and disruptive behavior.

Previous research shows that the method of Conjoint Behavior Consultation may be effective in dealing with disruptive behavior in the classroom (Sheridan, Eagle, Cowan, & Mickelson, 2001), as it allows overall interaction between the main actors and promotes collaboration.

Regarding reinforcement schedule for the disruptive and off-task behaviors, studies have shown significant efficacy of the fixed-interval schedule (Mather & Goldstein, 2001). Waller and Higbee in 2010 conducted a case study to discover the effects of fixed-interval reinforcement on the disruptive and appropriate academic behaviors of 2 junior high students in a public school. The results demonstrated a substantial decrease in disruptive behavior and an increase in the time engaged in tasks for both participants showing the effectiveness of this schedule.

On the basis of the literature review it was decided that a modified form of CBC would be introduced in the initial period of the plan, while contingent reinforcement procedures would act as the mainstay of the plan. These would be utilized for the dual assessment of both teachers and the student with a follow-up of their performance in the post intervention period.

The objective of the present research is to find out if an intervention based on contingent reinforcement procedures can be adapted for dealing with disruptive classroom behavior.

This research aims to answer the following questions:

1. Can contingent reinforcement help in dealing with disruptive classroom behavior?
2. What problems would teachers face in the understanding and implementation of the contingent reinforcement procedures?

Method

Operational Definitions of Variables

Maladaptive behavior or Disruptive behavior: This is defined as problem behavior that interferes with daily life activities. In this study, off-task disruptive behavior is considered as the maladaptive behavior.

Off-task disruptive behavior: This is maladaptive behavior that does not follow the demands of the task at hand. For this study it includes specific behaviors based on the information of the consultees (teachers and father of the participant), including: not following the teachers' instructions for a task, looking away from the task, disturbing the on-task performance of others by talking, poking with fingers or touching by the water bottle. The definition also included any activities in which the teacher had to disrupt her routine to specifically deal with the participant 'S'.

On-task non-disruptive behavior: This is replacement behavior that follows the demands of the task at hand. It included listening carefully to the teachers' instructions and following them with visual attention towards the task, talking to others only when the work was completed and using her words rather than touching by any means to get another child's attention when the teacher allowed it or at times of urgent need for stationary or other material.

Participants

The main participant of this study was an 11 year old girl studying in grade 7 (henceforth referred to by the pseudonym 'S') identified with behavioral problems and referred by the school administration. The school was a relatively small establishment having nearly 20 children per classroom while the setting was that of a tightly knit local community school located in suburban Karachi. The family socioeconomic status (SES) was considered low for nearly all the children studying in the school including the participant.

The teachers and the girl's father served as 'consultees' during the entire process. Also, the teachers may be considered as additional participants of the research procedure as their behavior was also monitored for qualitative analysis during the process. The consultants (Authors) worked as a team to determine an appropriate behavioral intervention plan (BIP).

In order to get detailed information about the participant and the target behavior, all of 'S's' current teachers as well as her father were interviewed individually. This also helped to acquire important information about the perceptions of the teachers about 'S'.

Miss A (teaching English and Science participants to 'S' from grade 6)

Miss A described 'S' as a *playful* and *undisciplined* girl. She was negative about her attitude towards studies in class and reported that she had barely passed the 6th grade. According to her, 'S' would disturb the class and tease other students. She also *did not complete her homework* and only paid attention to class work when Miss A looked at her or asked to do her work. She reported that if 'S' still *does not attend to the instructions given* or *teases* or *talks in class* with other students, she punishes her and makes her stand on the seat in the class.. 'S' obeys the instructions but *argues* that she has not done anything. Miss A added that she received frequent complaints from other students about 'S' that she is teasing them or asking for stationery. Miss A reported that her mother had been called several times to school, but she never came and instead sent an indirect message through "S" saying that 'S' should handle her problems on her own and she is not responsible for her deeds. The only

two positive points Miss A could note about 'S' at the end, after probing, were that she is *innocent and respects teachers*.

Miss B (teaching Social studies to 'S' in class 6 and Islamic studies in class 7)

Miss B reported that 'S' did not give appropriate answers to questions in the exams and barely passed. She mentioned the only one good quality of 'S' as her overall good behavior with teachers and students, but evaluated her negatively on her lack of focus on her work in class, her procrastination during class work, need for reminders and mid-class breaks for using the washroom or drinking water. However she agreed that when she was explaining lessons from the book 'S' listened attentively. According to her, 'S' was a disorderly girl who did her homework carelessly and wore an untidy uniform with unique hairstyles and clips, which were strictly prohibited. Miss B also used punishment and preferred verbally embarrassing 'S' in front of the class so that she would realize her mistakes, and on one occasion had refused her permission to participate in the sports week. She also had tried to call 'S's mother but she did not come.

Miss C (teaching Arabic to 'S' from class 6)

Miss C reported that 'S' makes noise in the class, talks during lectures, laughs at teacher's inadvertent mistakes, procrastinates submission of work, does not bring her copy and works on rough pages, eats during class, comprehends instructions incorrectly and does not bother to clarify, and is fond of talking about television soaps and anecdotes related to her relatives. Other students mostly complain about 'S' that she is irritating them. Miss C uses both verbal and social punishers, as she scolds S and makes her sit with her at the front of the class. 'S' protests but Miss C ignores her.

Miss D (teaching S for the first time in grade 7)

Miss D reported a range of negative behaviors and had nothing positive to say. She said that 'S' does not focus on her work, does not do her homework, is noisy in the class, over acts, and does not respect teachers. Miss D has not been able to make her comply with her punishment, as 'S' refuses to go out of the class and denies having done anything wrong. Miss D then ignores her and starts teaching the class. Miss D compared her to other girls, saying she is the only one who neither completes her homework or class work.

'S's father

He reported that she is good at home and helps her mother with chores, but he does not like her loud voice and manner at times. He said that 'S', while sharing school activities with him, complains about her classmates' negative attitudes toward her and describes her own behavior as directed towards amusing them. He felt that teachers such as Miss D do not

want to explain answers in detail, if students do not understand at the first explanation, and resort to unnecessary scolding. However, he added that his wife follows up on 'S's study matters as he does not have enough time.

'S's mother

Initially the mother was contacted and she agreed to come in and provide details as the consultee, but for the duration of the study she did not come to the school or cooperate in giving information. The father did not disclose any reason for her lack of interest.

The participant 'S':

According to 'S', her father had retired from the armed forces and now ran a shop. She reported that her mother is a housewife educated at Class 9 level. She has two elder brothers and one younger sister. She reported good relations with her family. She belonged to a lower middle class Muslim family. Her only hobby was drawing when she had spare time.

She reported that she had been studying in the current school since class 4 and she liked the school and wanted to establish friendly relations with all. Her interview showed that she rarely perceived her punishers as deserved punishment and derived a sense of negative attention and accomplishment from them. She felt her jokes, especially those involving touching the others, were misunderstood by her classmates, who complained to the teachers, and as a result, they punished her. She said that she liked Miss A and a few other teachers, even though Miss A and Miss E (another teacher) had each hit her with a steel scale on her hand as punishment for poor marks, and for touching a girl so that she had fallen down, respectively. 'S' mentioned that she likes and enjoys the punishment of standing on her seat or on desk in the class but does not like being hit by the teacher in class or when she is made to stand at the back of the class because there she cannot talk with other girls.

Procedure

The procedure followed the three phase standard ABA protocol in which the phases were divided as Pre-Intervention (identification of problem behavior and baseline), Intervention and Post-Intervention follow up.

Pre-Intervention Phase

The school administration was approached and the objective of the study, its implications and general timeline was discussed. It was decided through the participant selection criteria that any student or students displaying the criteria for disruptive behavior in the classroom setting would be selected for inclusion in the behavioral intervention program. Participant selection was based on teacher referral concerns and the administrative level

perceptions of disruptive behavior based on repeated complaints by the teachers and other students in the classroom. A few cases were reported that met the selection criteria and were similar in nature but due to difference in class level and / or same class timings the procedure could not be coordinated and it was decided by the administration and the consultant to analyse and later generalize the results for the behaviors taking place inside one classroom only with special focus on ‘S’ and the teacher – student interaction.

In the case of ‘S’, the main reason for referral was disruptive behavior that interfered with her ability to complete tasks and act in accordance with classroom rules. Also it seemed she did not meet the expectations for social conduct appropriate to her age group according to the report of her teachers. As a result, she was in danger of being excluded from her mainstream classrooms. Thus the selection criteria included (a) teacher referral and (b) informed consent of the participant.

The CBC followed the four-stage problem-solving process of the behavioral consultation model including: 1. Problem identification (PI), 2. Problem analysis (PA), 3. Treatment implementation (TI), and 4. Treatment evaluation (TE). These were embedded in the standard ABA three-stage method.

The *Pre-Intervention Phase* included two components of the CBC. The first, involved *Conjoint Problem Identification Interviews (CPII)* that were conducted with the consultees (teachers and the father of ‘S’ as well as ‘S’) to (a) establish a climate of shared responsibility, (b) share information about the goals of the BIP, (c) educate regarding roles and responsibilities, (d) operationally define maladaptive target behaviors, and (e) affirm data collection measures. In accordance with CBC, the consultation team reviewed the data, reached a consensus regarding the nature of the problem and the expected outcomes. Initially ‘S’ was not told about the observation but after 5 days of observation of the class and the teachers, she was approached and informed consent was taken. ‘S’ was quite excited about the project and showed her willingness to fully cooperate with the consultants. Initially she seemed afraid of her father’s reaction but was willing to cooperate after the general procedure and rationale of ABA was explained to her.

Next, the *Conjoint Problem Analysis Interviews (CPAI’s)* were conducted after establishment of a stable baseline. During this stage, the consultants analyzed baseline data, explored intervention methods, agreed upon a goal for behavior modification, and discussed BIP implementation. A contingency contract outlining the reinforcement types and general outline was agreed upon and signed by the consultation team, the teachers and ‘S’.

Intervention Phase

During the *Treatment Implementation phase*, the agreed-upon BIP was implemented for 10 days divided into two parts. Each day, the plan was implemented for 2 periods of 30 minutes each. Based on the literature review, it was decided to use positive reinforcement on a fixed schedule for the first part for 5 days that would be predictable and easy for 'S' to follow and half the amount of contingent reinforcers, again in a fixed schedule for the second part of 5 days to help maintain the Behavior. Therefore, contingent reinforcement included tokens that could be exchanged to get back up reinforcers and social reinforcers in the form of stars (pasted on reward chart hanging on the wall of staff room) and verbal praise (by the teacher 2 times during class). The above mentioned reinforcers were dispensed in 3 pre decided steps for which the teachers were trained by the consultation team. It was decided to replace the contingent punishers, currently being used by the teachers for disruptive off-task behavior with contingent reinforcement for on-task non-disruptive behavior.

1. *Verbal praise by the teacher:* Verbal punishers were replaced by verbal reinforcers as teachers were trained to praise 'S' twice, in words specifying the on-task non-disruptive behavior of 'S' in a 30 minute period. The praise was made contingent upon a) doing class work following given instructions and b) not disturbing other girls for at least ten minutes. The amount of praise was halved for the next part of the treatment phase.
2. *Stars and tokens:* Social punishers were replaced by social reinforcers made contingent on each of the two given tasks as after each period, 2 stars were given to 'S' to paste on a reward chart hanging in the staff room. One star was given for each of the two tasks completed in one period. In this way, 'S' was able to get maximum 4 stars for 1 day. This amount was halved for the second half of the treatment phase.
3. *Back up reinforcers:* Corporal punishers were indirectly replaced by material reinforcers as 1 token was made contingent on any desirable behavior shown in a single period. In this way 'S' was able to get maximum 4 tokens each day. On each token praising comments were written by the teachers according to 'S's choice. At the end of two periods, 'S' could 'purchase' a maximum of any two of three predetermined back up reinforcers of her choice for 2 tokens. This amount was cut down by half for the second half of the treatment phase.

All reinforcements including the tokens and the reward chart were selected and made attractive according to 'S's choice. The final interview was the *conjoint treatment evaluation interview (CTEI)* to discuss consultation goals, any modifications, and to determine effectiveness of the BIP.

Post-Intervention Phase

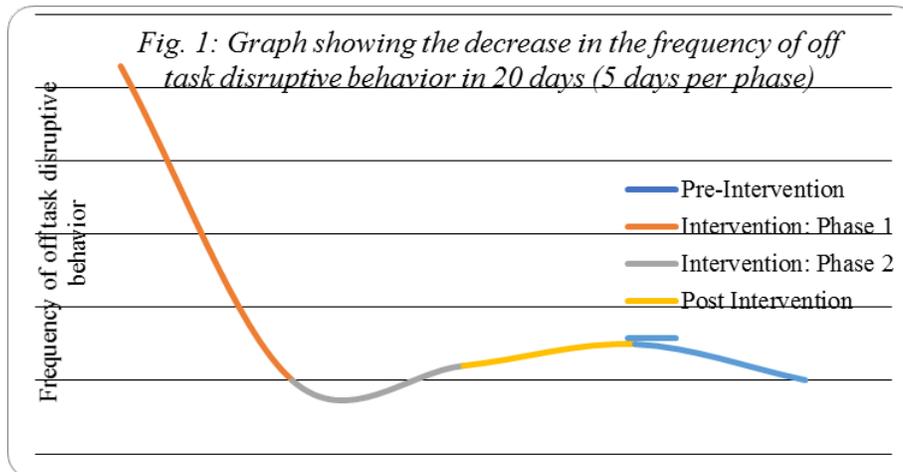
For the purpose of observing the effectiveness of contingent reinforcement procedures in establishing the on-task non-disruptive behavior and its maintenance after the intervention, post intervention follow-up was maintained for 10 periods in 5 days.

Results

Observational Ratings

Qualitative data based scatter sheets were made for each of the phases and they graphically display the observational data for 'S' across consultation phases. Visual analysis of the graph in figure 1 based on frequencies observed shows a comparatively high linear trend at baseline level and an immediate effect on the disruptive behavior with the initiation of the treatment plan. A large effect size and positive behavioral trend from baseline to treatment was evident. 'S' demonstrated an increased sense of on-task non-disruptive behavior and more self-control (compliance and on-task behavior).

Figure 1



The frequencies obtained for each of the phases can be described as follows. In the pre intervention phase, 'S' showed off-task disruptive behavior 43 times for 10 periods in 5 days and the baseline was established at an average of 4.3 times for one period. In the intervention phase, the results of the participant showed a significant decline in off-task disruptive behavior. In part 1 of the intervention the 'S's off-task behavior declined to 0 for 5 days as compared to the baseline of 43 in pre intervention for 10 periods in 5 days. In the second part 'S's off-task behavior showed a slight increase to 2 times for 10 periods in 5 days. In the post intervention phase, the results show significant maintenance of the on-task non-disruptive behavior established during intervention. During 10 periods' observation in 5 days, disruptive off-task behavior was shown by the participant five times only. These results show the success of the intervention.

Table 1

Table 1 Showing the Frequency distribution and of the Off Task Disruptive Behavior in a Participant 'S'. (N = 1)

Phase	Frequency of Off Task Disruptive Behavior (No. of times / 30 minute period)	Total days
Pre Intervention	43	5
Intervention (Part 1)	00	5
Intervention (Part 2)	02	5
Post Intervention	05	5
Total days		20

Discussion

Classrooms are the earliest centers for learning. This learning is based on not only the textbooks but involves a multilevel understanding based on the perception of roles, hierarchies, behavior patterns and interactions with others. In turn all these may lead to a better understanding of the self.

Disruptive behavior in the classroom that is off-task or disturbs others may lead to a tension filled class environment promoting hostility and anger on the part of all three actors in the situation – the teacher, the child performing the disruptive behavior and the other children. The implications can be drastic as in several cases, this has led to the low achievement of students in cases of an improperly managed classroom. These students may

then end up being referred for special education (Donovan & Cross, 2002; Harrell, Leavel, van Tassel, & McKee, 2004).

This case study exemplifies a classic example of such a condition in which the solution attempted is based on contingent reinforcement. The school in question had a population of economically disadvantaged students and this population has been known to house more instances of disruptive behavior in the class (Kellam, Ling, Merisca, Brown & Ialongo, 1998).

The study documents the effectiveness of ABA procedures and contributes to a growing body of research based on the CBC model. It adds to existing literature by merging the CBC model with contingent reinforcement procedures at the treatment level. The intervention package led to an immediate improvement which was maintained over time as demonstrated by the follow up post intervention phase.

Additionally, the consultees (father and teachers) as well as the school management were fully satisfied with the process and outcomes of consultation. The school based consultees agreed that the process could be replicated for use in other classrooms after adequate training of the concerned teachers as in the case of the teachers for Class 7.

In the case of 'S' it was seen that punishers were not effective as they provided her with enjoyment and a form of negative attention and this raises the questionability of using punishment as disciplinary measures. The replacement of punishment with reinforcement made contingent upon the performance of certain behaviors was based on Premack's principle (Premack, 1959, 1963) which also carries the theoretical implications for this case study. This principle simply states that more preferred behaviors will reinforce less preferred behaviors. In this study, the less preferred behaviors of paying attention to class work and not disturbing other students were reinforced by the more preferred behaviors that served the dual purpose of changing the focus of negative attention to positive attention and also led to a difference in the perception of 'S' towards the teachers and vice versa. Towards the end of the intervention process, the teachers perceived 'S' as more cooperative and focussed and this, along with the training they received led to fewer accounts of verbal punishment from them.

The study also raises the need for proper training of the teachers and the correct enforcement of contingent reinforcement as the consultation team faced issues in getting the teachers to refrain from using indirect punishers. In one instance, Miss A withheld praise on the account that just before the intervention period, 'S' had been showing inappropriate behavior. Thereupon the researcher explained the rules of contingent reinforcement

indicating that reinforcement should be immediate and consistently contingent upon the desirable behavior shown by the student and that delay and inconsistency can discourage the student to show desirable behavior. This incident is just one of many such examples that occurred during the course of the intervention. While this adequately answers the research question of the problems teachers would face in the understanding of the contingent reinforcement procedures, it also raises the need for monitoring of the teachers to ensure correct application of the BIP.

Limitations and Recommendations

While it is encouraging to note the successful outcome of the study, and it follows a rigorous single participant design as recommended in similar studies (Wilkinson, 2005) that helps to rule out any threats to internal validity, there is need for the replication of this intervention package if the results are to be generalized to other students displaying disruptive behavior patterns. Further, the inclusion of non-treatment controls would be helpful in determining the efficacy of the treatment model. Time constraints for the procedure did not allow for a further follow up of the participant 'S' and future researchers may consider the possibility of a procedure that is longer in duration in each phase and monitors the time based changes post intervention. Additionally, the behavior of 'S' could be better analyzed in the light of an understanding of the mother's role in her emotional development. Lack of this information creates a less than adequate observation of CBC.

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