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## Case Studies in Applied Behavior Analysis: Using a Desensitization Procedure to Decrease Problem Behavior Towards Peers and Using a Treatment Package to Increase Time Spent in a Small Group

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Case Studies in Applied Behavior Analysis: Using a Desensitization Procedure to Decrease  
Problem Behavior Towards Peers and Using a Treatment Package to Increase Time in a Group

by

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A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science in Applied Behavior Analysis  
Department of Child and Family Studies  
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## TABLE OF CONTENTS

List of Figures .....	ii
Abstract .....	iii
Chapter One: Using a Desensitization Procedure to Decrease Problem Behavior Towards Peers.....	4
Introduction.....	4
Method .....	6
Participant and Setting .....	6
Experimental Design.....	7
Data Collection and Interobserver Agreement .....	7
Behavioral Assessment .....	8
Procedures .....	9
Baseline.....	9
Intervention .....	10
Tolerating Sight of Peer(s).....	10
Tolerating Peer(s) in the Same Room.....	11
Tolerating Parallel Play with Peer(s) .....	12
Results.....	13
Discussion.....	14
Chapter Two: Using a Treatment Package to Increase Time in a Group .....	19
Introduction.....	19
Method.....	21
Participant and Setting .....	21
Preference Assessment.....	22
Experimental Design.....	22
Data Collection and Interobserver Agreement .....	22
Procedures.....	23
Baseline.....	23
Intervention .....	23
Results.....	25
Discussion .....	25
References.....	29

## LIST OF FIGURES

Figure 1:	Results from the QABF form, escape and the tangible functions received.....	17
Figure 2:	Peer desensitization procedure effect on peer avoidance and protest.....	17
Figure 3:	The percent correct and incorrect number of trials for the desensitization.....	18
Figure 4:	Percent of items selected from the MSWO preference assessment.....	27
Figure 5:	Duration of participation in group in minutes.....	27

## ABSTRACT

In this paper, the author will report the procedures and results for two case studies: Using a desensitization procedure to decrease problem behavior towards peers and using a treatment package to increase time spent in a small group. Both case studies took place in a clinic setting with participants diagnosed with autism spectrum disorder (ASD), a 4-year-old male and a 9-year-old female. The first case study evaluated the effectiveness of a desensitization procedure to decrease problem behavior and increase tolerance of peers in the environment of a 4-year-old boy with ASD. The case study was successful in decreasing problem behavior and increasing the tolerance of peers in the participant's environment. The second case study used a changing criterion design to monitor and implement a shaping procedure to increase the time spent in a small group for a 9-year-old girl with ASD. A visual schedule, reinforcement, and prompting procedures were also included in the shaping procedure. Results demonstrated that the shaping procedure and behavioral strategies were successful in increasing the time spent in the group for the participant.

**CHAPTER ONE:**  
**USING A DESENSITIZATION PROCEDURE TO DECREASE PROBLEM BEHAVIOR**  
**TOWARDS PEERS**

**Introduction**

Children with autism spectrum disorders (ASD) have deficits in social, emotional, and communication skills (Centers for Disease Control and Prevention [CDC], 2019). Deficits in these areas may lead to peer social avoidance behaviors. Peer social avoidance behaviors, such as engaging less time in proximity, observing, imitating, or engaging in social interactions with peers occur more frequently in children with disabilities than typically developing children (Ingersoll et al., 2001). Along with peer social avoidance behaviors, there can exist competing problem behaviors that interfere with the opportunity to learn peer-related social skills such as externalizing behaviors, non-compliance or aggression, and internalizing behavior patterns, social withdrawal or anxiety (Gresham et al., 2010). Competing behaviors may often need to be addressed first prior to implementing social skills with children with ASD who have deficits in this area.

McGreevy's et al. (2012) Essential for Living assessment and curriculum book, lists desensitization procedures that can be used to expose individuals to new situations, people, or instructions where competing behaviors may occur (McGreevy et al., 2012). The Essential for Living (McGreevy et al. 2012) curriculum lists a hierarchy of situations to desensitize

individuals to other specific individuals in the following order: Tolerate sound, sight, room, engagement, etc. Systematic desensitization is a behavioral intervention that has been used to treat anxieties, fears, and phobias (Cooper et al., 2007). In systematic desensitization, the learner or practitioner, list a hierarchy of situations from the least to most fearful. The learner then imagines going through each step while remaining relaxed. The final step would be in vivo desensitization, where the learner begins to gradually expose himself to each step in the hierarchy. Gradual exposure is also systematic desensitization, but it does not involve imagining each step before in vivo desensitization, rather it consists only of the construction of the hierarchy and in vivo desensitization (Tanner & Andreone, 2015).

Systematic desensitization procedures have been used to help expose individuals to dental (Conyers et al., 2004), food (Tanner & Andreone, 2015), and medical procedures (Cavalari et al., 2013). In a study conducted by Conyers et al. (2004), a desensitization program, along with the use of a task analysis, was implemented to teach individuals with disabilities to tolerate dental procedures. The participants were successful in complying with all steps in the task analysis when receiving in vivo desensitization. In a study conducted by Tanner and Andreone (2015), a 12-step food hierarchy desensitization procedure was used with 3-year-old boy with food selectivity. The study was successful in increasing the food acceptance of over 59 foods compared to only four foods at the start of the study. However, the graduated exposure lasted 100 sessions over the span of nine months. Another study conducted by Cavalari et al. (2013) implemented a 12-step desensitization procedure, with 74 sub steps along with positive reinforcement, to increase compliance of medical routine procedures for a 16-year-old girl with an ASD and an intellectual disability. The procedure was effective in having the participant comply with all steps in the hierarchy.

To this date, the author found no current published literature in which desensitization procedures have been used to gradually expose an individual with ASD or disabilities to other specific individuals. For this reason, the purpose of this case study is to evaluate the effectiveness of a desensitization procedure to decrease problem behavior, protest and avoidance towards peers, and increase tolerance of peers in the participant's environment. The desensitization procedure followed some guidelines from the Essentials for Living assessment and curriculum book to help the participant tolerate a hierarchy of least to most aversive situations, such as tolerating peers within sight (PS 10s, 20s, 30s), in the same room (PR 1min, 1 min 30s....5min), and parallel play (PP 30s, 1min....2min).

## **Method**

### **Participant and Setting**

MB is a 4-year-old boy diagnosed with autism spectrum disorders (ASD). MB can mand with more than two words to request items, activities, and the actions of others. MB receives in clinic applied behavioral analysis (ABA) services. MB has deficits in social skills such as being unable to mand to peers his age and tolerating peers in his environment. When in the same room with peers, MB will request to leave the room to the therapist, engage in crying that last more than three seconds, and verbal protest in the form of "no", "no friends", or "no (peers name)." Parents have expressed concern over the lack of social interactions and problem behaviors he engages in when around other peers his age. This case study was conducted in the participant's clinic where he receives ABA services.



## **Experimental Design**

An AB design was used in this study. The intervention was implemented by two therapists on his case.

## **Data Collection and Interobserver Agreement**

Data were collected on the frequency of the problem behavior of avoidance and protests toward peers. Avoidance and protests toward peers were defined as any instance in which MB moved away from a peer more than one foot when they approach him or engaged in same activities/toys as him, requested to leave room where peers were in, stated “no”, “bye, bye”, shook his head no, or moved his finger in a side to side no sign in the presence of peers.

Data were also collected on the number of trials correct, 100%, and incorrect, 0%, for the peer desensitization procedure. In the peer desensitization procedure, a trial began when the therapist stated the discriminative stimulus (SD) and started the timer for the specific amount of time for the corresponding condition. The trial ended when the participant stayed for the entire duration, problem behavior, and the participant stated “let’s go” when given that prompt by the therapist. To move onto the next time interval or condition the participant was required to meet mastery criteria of three correct consecutive trials at 100% without problem behavior.

Due to supervision constraints, interobserver agreement (IOA), was unable to be collected for this case study. The frequency of the problem behavior was collected throughout the entire 6 hr session and supervision with supervisors lasted 1-2 hrs at least once a week. Interobserver agreement (IOA) would have been collected for 20% of sessions by a second observer on the frequency of avoidance and protest toward peers. IOA would have been

calculated using total count IOA by dividing the smaller number of the counts divided by the larger count.

## **Behavioral Assessment**

A behavioral assessment was conducted that consisted of an indirect and direct assessment of MB's problem behavior. The Questions about Behavioral Function (QABF) (Matson & Vollmer, 1995) was utilized and provided to MB's primary caregiver to answer. The QABF is an indirect assessment consisting of 25 questions in which caregivers rate each question along a four-point Likert scale as never (0), rarely (1), some (2), and often (3). The assessment then scores each question into five categories reflecting the behavioral functions of attention, escape, physical, tangible, and non-social. The escape and tangible condition had the highest scores compared to all other conditions with a score of 10, results are show in Figure 1.

The direct assessment consisted of taking ABC narrative recording across three days. All observations took place during MB's 6 hr sessions during which he received ABA in clinic services. Data were recorded on the antecedents, behaviors, consequences, and hypothesized function. After a consequence occurred the therapist recorded what function that behavior was hypothesized to be maintained by, such as attention, automatic, escape, and tangible. The total amount of times the hypothesized conditions occurred after the consequence were recorded and summarized at the end of each observation day. The hypothesized functions, escape and tangible, occurred more commonly following problem behavior.

Based on the results from the indirect and direct assessments, the peer desensitization procedures were created to address the hypothesized functions of escape and tangible. During all

conditions of the desensitization procedure, MB was required to tolerate specific intervals of time with no problem behavior. The trial ended with MB being provided with the appropriate escape replacement behavior, “you can say let’s go. During the last hierarchy of the peer desensitization procedure, parallel play, the tangible function was addressed by requiring MB to play with the same toys with another peer in proximity for specific intervals of time with no problem behavior before. The trial was terminated when MB was provided with the same appropriate escape replacement behavior, “you can say let’s go”.

## **Procedures**

### **Baseline**

Baseline data were collected on the frequency of problem behavior, avoidance and protest towards peers, across three days during MB’s six-hour sessions in the clinic. When problem behavior occurred, the therapist did not intervene unless avoidance and protest behaviors led to problem behaviors targeted for reduction by the client’s treatment plan. The therapist needed to intervene because the case study was being conducted in the clinic setting during MB’s 6 hr session. For example, when MB entered a room with peers and engaged in protest towards peers which led to crying behavior, based on his treatment plan, the therapist was required to intervene. All baseline data were collected by MB’s primary therapist.

## **Intervention**

The intervention consisted of a desensitization procedure in which MB was required to tolerate the sight, being in the same room, and parallel play with another peer. Each condition had a set number of time intervals MB needed to tolerate with no problem behavior. Mastery criteria for moving from one condition to another was 100% across three correct consecutive trials with no problem behavior. If no progress was made after three days and MB continued to be in the same condition, procedures were revised, and/or MB was moved down to a prior condition in which he showed mastery.

**Tolerating Sight of Peer(s).** This condition, peer sight (PS), involved tolerating the sight of peers for 10s, 20s, and 30s. Before the trial began, the therapist stated to MB “walk with me” or “let’s go” and he was taken to a room where peers were present. The therapist would open the door and MB would wait at the entrance of the door. The trial began when the therapist stated the SD, “we are going to play with friends,” and the timer would begin. The trial was considered correct when MB was able to wait the entire duration of the trial without problem behavior. The trial ended when MB stated, “let’s go,” when the therapist delivered verbal praise and the prompt, “good job playing with friends you can say let’s go”. A trial was marked as incorrect, when problem behavior occurred, and the therapist stated, “we need to wait with a calm body and quiet voice,” and after 10s with no problem behavior the therapist would restart the timer. The trial ended when MB stated, “let’s go” after the therapist delivered corrective feedback and the prompt, “nice try next, time we need to have a calm body and quiet voice when playing with friends, you can say ‘let’s go.’”

After the trial ended, a consequence was delivered when MB scored correct or incorrect on the trial. When MB scored correct on a trial, verbal praise was delivered, and he was able to select what activities or toys he could engage in after the trial ended. When MB scored a trial incorrect, the therapist would bring him back to his room and he would engage with neutral activities (puzzle, blocks, books, etc.) for five minutes. After MB reached mastery criteria, 100% correct across three consecutive trials in the interval 30s for this condition, he moved onto tolerating peers in the same room for 1 min.

**Tolerating Peer(s) in the Same Room.** This condition, peer room (PR), involved tolerating peers in the same room for 1 min, 1 min 30s, 2 min, 2 min 30s, 3 min, 3 min 30s, 4 min, 4 min 30s, and 5 min. Originally, this condition had intervals increasing as 1 min, 3 min, and 5 min. However, after three days with no progress in condition PR 3 min and an increase in problem behavior occurring from sessions 15 to 17, shown in Figure 2, MB was moved back to condition 1 min as shown in Figure 3. Prior to starting PR 1 min, another change was made in which the trial was restarted when problem behavior occurred and each condition was increased 30s. Before the trial began, the therapist stated to MB “walk with me” or “let’s go” and he was taken to a room where peers were present. MB was required to be inside the room with the door closed or open. The trial began when the therapist stated the SD “we are going to play inside with friends, you can play with balls, cars, or blocks (any variation of toys available),” and the timer would begin. Verbal praise in the form of “good job playing inside with friends” was delivered every 15s during the duration of the trial. The trial was considered correct when MB was inside the room with peer(s) without problem behavior for the entire trial. The trial ended when MB stated, “let’s go,” when the therapist delivered verbal praise and the prompt, “good job playing inside with friends, you can say let’s go”. A trial was marked as incorrect when problem

behavior occurred and therapist stated, “we need to play inside with friends with a calm body and quiet voice,” and after 10s with no problem behavior the therapist would restart the timer. The trial ended when MB stated, “let’s go,” after the therapist delivered corrective feedback and the prompt, “nice try, next time we need to have a calm body and quiet voice when playing inside with friends, you can say ‘let’s go.’” The consequence delivered after the trials ended for correct and incorrect trials were the same as in the condition SP. After MB reached mastery criteria, 100% correct across three consecutive trials in the interval 5 min for this condition, he moved onto tolerating parallel play with peers for 30s.

**Tolerating Parallel Play with Peer(s).** This condition, parallel play (PP), involved parallel play two feet apart from another peer(s) for 30s, 1min, 1 min 30s, and 2 min. Before the trial began, the therapist would take MB to an activity, game, or toy that a peer would already be engaging in, or involve the peer in the activity, game, toy that MB was currently playing with. The trial began when the therapist stated the SD, “we are going to play (toy, activity) with friend(s),” and the timer started. Verbal praise in the form of, “good job playing with friend(s),” was delivered every 15s for the duration of the trial. The trial was considered correct when MB was able to play next to the peer(s) the entire time without problem behavior. The trial ended when MB stated, “let’s go” after the therapist stated verbal praise and the prompt “good job playing with friends, you can say let’s go”. A trial was marked as incorrect when problem behavior occurred and the therapist stated, “we need to play with a calm body and quiet voice next to friends,” and after 10s with no problem behavior the therapist would restart the timer. The trial ended when MB stated, “let’s go,” after the therapist provided corrective feedback, “nice try, next time we need to have a calm body and quiet voice when playing with friends, you

can say let's go." After the trial ended, the same consequence was delivered as in the previous conditions for correct and incorrect trials.

## Results

Figure 2 illustrates the effect of the peer desensitization procedure on MB's problem behavior. In baseline, problem behavior was at moderate levels and once the intervention was implemented there was not an immediate change in level. MB was in the condition PS from sessions four through nine. After MB met mastery criteria for PS 30s, MB began the condition PR in session 10. Figure 3 illustrates the number of correct and incorrect trials for each condition in the desensitization procedure. Once the condition, PR 1 min, began problem behavior decreased, as shown through sessions 10 through 12. However, MB made no progress towards moving onto condition PR 3 min. After three days in condition PR 1 min and no progress was made, the SD was changed from "we are going to play inside with friends" to "we are going to play inside with friends, you can play with balls, cars, or blocks (any variation of toys available)." This change was made to provide MB with a prompt to engage in his environment while he waited for the appropriate escape prompt, "let's go." Once MB mastered condition PR 1 min he moved up to condition PR 3 min. Once condition PR 3 min began, there was an increasing trend across three days with the highest data point reaching 32 instances of problem behavior. After three days with no progress in condition PR 3 min and an increase in problem behavior occurring from sessions 15 to 17, shown in Figure 2, MB was moved back to condition 1 min as shown in Figure 3. Figure 3 shows MB moving from PR conditions 1 min to 2 min with no trials at 0%. When PR 3 min began, the condition was much shorter compared to the first

attempt at the condition. Afterwards, MB moved from conditions 4 min to 5 min with no trials at 0%, as shown in Figure 3. PR 5 min ended in session 25, shown in Figure 2, and a decreasing trend is observed with problem behavior reaching zero instances.

After MB met mastery criteria for PR 5 min, MB began PP 30s in session 26 as seen in Figure 2. When PP 30s began, problem behavior increased and spiked at session 27 with 28 instances of problem behavior. However, after session 28, problem behavior showed a decreasing trend. In Figure 3, MB met mastery criteria for PP 1min and moved onto PP 1 min and 30s. After meeting mastery criteria in PP 1 min and 30s, he moved onto PP 2 min, where he met mastery criteria as well. MB engaged in six instances of problem behavior when he met mastery criteria in 2 min. In baseline, problem behavior was at moderate to high levels and towards the end of the study behavior was at low levels.

## **Discussion**

This desensitization procedure was implemented to decrease problem behavior towards peers and increase MB's tolerance towards peers in his environment. The intervention was effective in decreasing problem behavior when MB was exposed to each condition and set amount of time, however there was not an immediate effect and large differentiation compared to baseline. For example, when the PS condition ended in session 8 and MB met mastery criteria, problem behavior was at 20 instances. However, when MB met mastery criteria for PR 5 min, problem behavior was at zero instances in session 25, see Figure 2. When the PP 30s condition was introduced, problem behavior increased and spiked at 28 instances in session 27, but then a



decreasing trend is observed afterwards. The case study concluded with MB reaching the targeted goal PP 2min.

One limitation in this case study, was that this case could have had maturation effects which could have contributed the MB's progress when moving from one condition to another. For example, during the condition PR 4 min through 5 min, when MB was moving from one condition to another with no incorrect trials, exposure to peers outside of the intervention could have impacted this progress. During MB's 6 hr session he was still exposed to other peers when certain activities took place in the clinic, such as circle time or peer play. During these activities, MB was unable to escape regardless of if he manded appropriately to leave without problem behavior. Since the start of this intervention MB has been in the clinic since the beginning of February 2021. Over time MB could have been desensitized to his peers outside of the intervention.

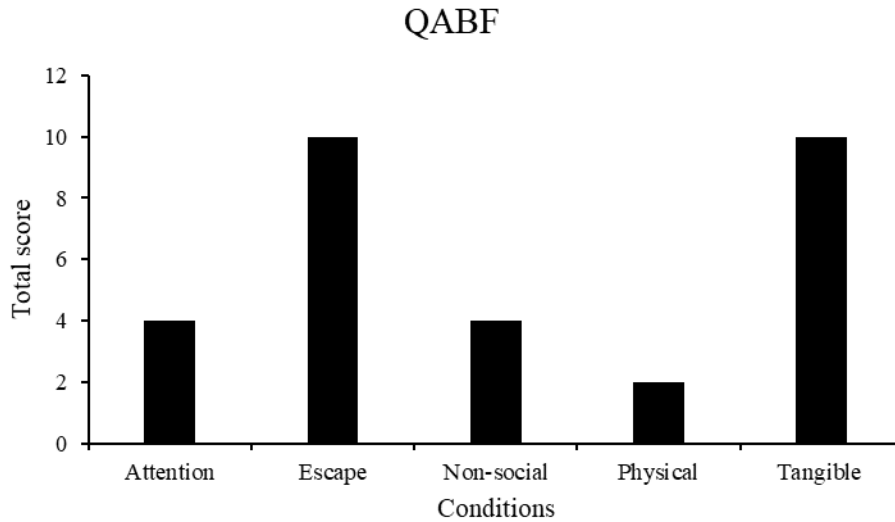
A second limitation was that the design of the study has weak experimental control. To demonstrate greater experimental control, data should have only been collected on the frequency of problem behavior when implementing the trials rather than throughout his entire 6 hr session. This would have demonstrated that the problem behavior no longer occurred when he met mastery criteria of 100% across three consecutive trials. A changing criterion design would have also demonstrated how MB met mastery criteria and moved from one condition to another for the peer desensitization procedure than just scoring correct or incorrect trials.

A third limitation to this case study, was that no preference assessment was preformed to assess what reinforcers were highly or low preferred. The consequences delivered when MB got a trial correct or incorrect were based on observations only. Reinforcers he received when he got

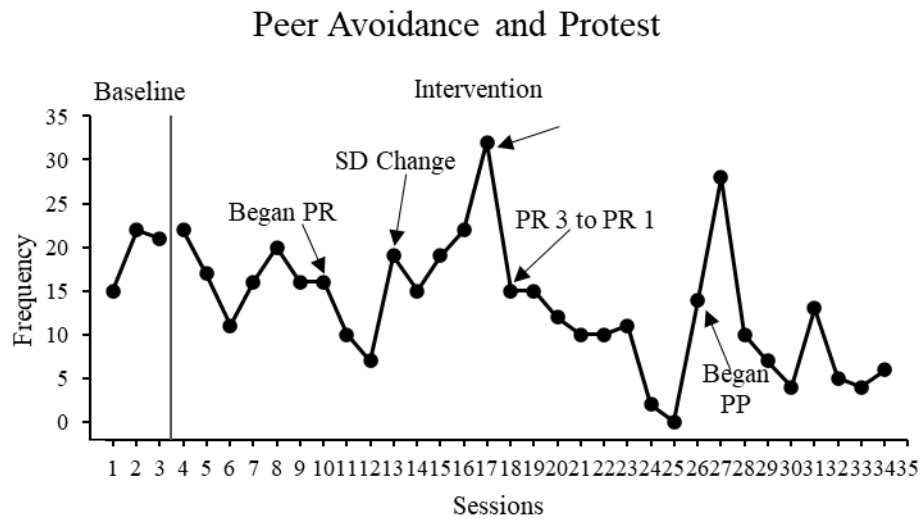
a trial incorrect could have been highly reinforcing even when categorized as “neutral activities.” A preference assessment could have helped in reaching mastery criteria more rapidly if clear differentiation between the correct and incorrect trials were experienced by the participant.

A fourth limitation in this case study was that attention was also provided after other problem behavior co-occurred with the target behavior. For example, when the targeted problem behavior occurred and overlapped with behaviors targeted for reduction in his treatment plan protocol, the therapist had to intervene. The behaviors in his treatment plan were addressed and therefore attention was also provided for the targeted problem behavior. This could have had a potential attention function on the targeted problem behavior.

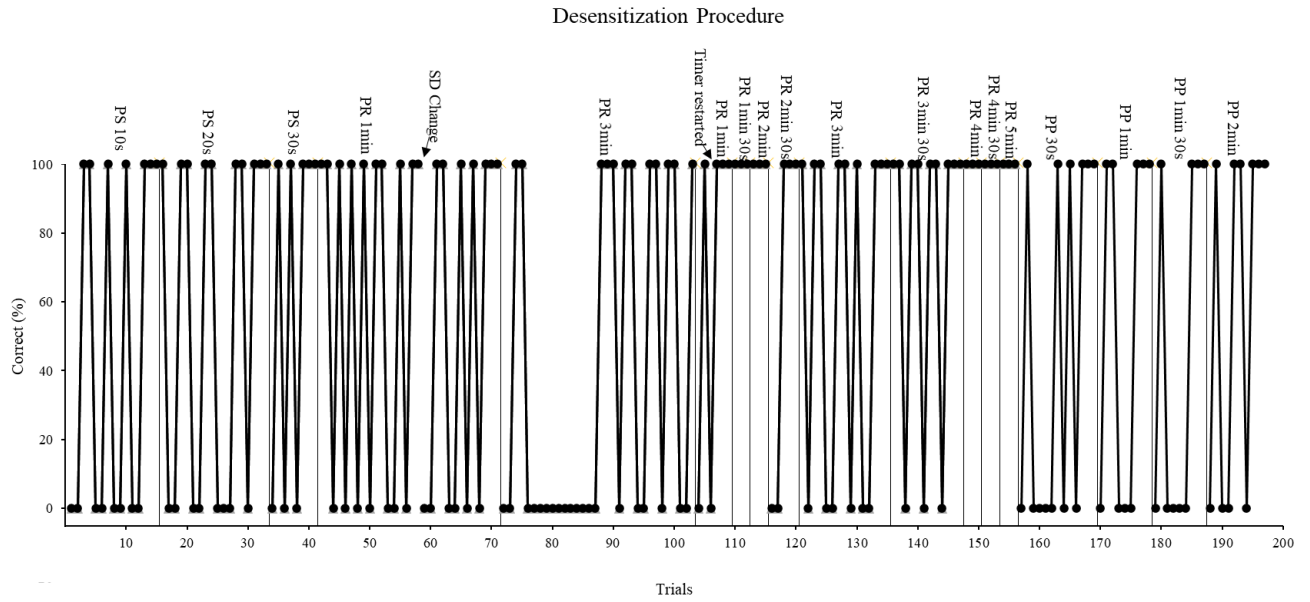
A final limitation for this case study was that a functional analysis was not performed for the participants problem behavior due to the participant not qualifying for an FA by the clinic’s guidelines. Direct assessments, such as ABC narrative recoding, are direct observations of the client’s problem behavior, but might identify functional relationships that do not exist. Indirect assessments, such as those with Likert scales, may yield incorrect results as they depend on the informants recall of past events. To state that the function of MB’s problem behavior is maintained by escape and tangible, a functional analysis must be conducted. Despite this case study’s limitations, this desensitization procedure was effective in increasing MB’s tolerance of peers in his environment and decreasing problem behavior towards peers.



**Figure 1.** Results from the QABF form, escape and the tangible functions received the highest score compared to all other functions.



**Figure 2.** Peer desensitization procedure effect on peer avoidance and protest behaviors. Frequency of peer avoidance and protest are shown on the y-axis and sessions are shown in the x-axis.



**Figure 3.** The percent correct and incorrect number of trials for the desensitization procedure. PS represents peers within sight of MB. PR represents MB in the same room with other peers. PP represents MB engaging in parallel play with other peers.

**CHAPTER 2:**  
**USING A TREATMENT PACKAGE TO INCREASE TIME SPENT IN A SMALL**  
**GROUP**

**Introduction**

Children diagnosed with autism spectrum disorders (ASD) exhibit higher levels of behavioral and emotional disorders in schools than typically developing peers (Ashburner et al., 2010). Teachers report that they feel undertrained in understanding how to manage these behaviors when they occur in the classroom setting (Lindsay et al., 2013). Prior literature has supported that addressing behavioral and emotional disorders can increase the likelihood of acquisition and maintenance of new skills in children diagnosed with ASD (Luczynski & Hanley et al., 2013). Behavioral interventions and strategies have been effective in reducing problem behavior with children with ASD.

To help mitigate behavioral and emotion disorders in the classroom setting, behavioral intervention strategies are often implemented to reduce the likelihood of these behaviors. Antecedent strategies such as response prompts, reinforcement, and visual schedules are used to evoke a correct response, increase the likelihood of the desired behavior in the future, and provide the learner with a predictability for activities led in a classroom setting (Crosland & Dunlap, 2012). Response prompts are supplementary antecedent stimuli used to evoke a correct

response before or during the performance of a targeted behavior (Cooper et al., 2007).

Examples of response prompts are verbal, modeling, and physical guidance prompts.

Reinforcement strategies are also utilized for increasing engagement in students with ASD in classroom settings (Meindi et al., 2020). Compared to typically developing children, children with ASD may not find social interactions, such as praise, or consequences, such as grades, reinforcing (Meinid et al., 2020). Immediate and contingent reinforcers may often have to be delivered upon the occurrence of appropriate behavior to increase the likelihood of those desirable behavior in the future and for the learner to associate their behavior with those consequences (Meinid et al., 2020).

Visual schedules are also antecedent strategies used to communicate upcoming events, to the learner, that may take place in a classroom setting (Crossland and Dunlap, 2012) to help reduce the likelihood of problem behavior (Macdonald et al., 2018). In a study conducted by Macdonald et al. (2018) a visual schedule along with the use of work systems, which included structured instructions and tasks, was used to increase the on-task behaviors of three students with ASD in a classroom size of 20-25 students. The procedure was effective in not only increasing on task behavior but also improving academic skills.

Shaping procedures are also used to increase the time spent in classroom settings without problem behavior. Shaping is the process of differentially reinforcing successive approximations of behavior until the terminal goal of that behavior is met (Cooper et al., 2007). In a study conducted by Azrin et al. (2007), a shaping procedure was implemented to increase the time two boys diagnosed with ADHD spent in the classroom without engaging in problem behavior.

Along with the shaping procedure the premack principle was used in which a reinforcer was

delivered contingent on classroom behavior and the amount of time spent in the setting. The study was successful in having the participants involved in the classroom for 15 min without engaging in problem behavior.

The purpose of this case study was to implement a shaping procedure to increase the time spent in a small group, in a clinic setting, for a 9-year-old girl with a history of aggressive behavior. Antecedent manipulations, such as the use of response prompts and visual schedules, as well as reinforcement were also included in the shaping procedure. A changing criterion design was used to monitor the shaping procedure and its effects on the successive approximations of the target goal. The long-term goal for this participant was to tolerate being in small group for 15 min and the short-term goal was 13 min.

## **Method**

### **Participant and Setting**

The participant, JD, was a 9-year-old girl diagnosed with ASD. JD has a limited verbal repertoire and can mand with up to three words. JD has had reductions in all problem behaviors such as aggression, property destruction, elopement, SIB, and other high intensity behaviors since receiving in clinic ABA services. Before the study, JD only tolerated five minutes in a small group without engaging in problem behavior. JD would often get up from her seat in the middle of group, manded for all done, engaged in aggression, and she had never been in group for the full time of 15 minutes. This case study was conducted in a clinic setting. Baseline and intervention procedures took place during small group instruction that was led by another therapist.

## **Preference Assessment**

A multiple stimulus without replacement (MSWO) was conducted to assess what reinforcers were to be utilized and scored as high and low preferred, see Figure 4 for results. Procedures were conducted in the same format as in DeLeon and Iwata (1996).

## **Experimental Design**

A changing criterion design was use for this case study. Mastery criteria for moving up to the next criteria goal was 100% across three consecutive sessions.

## **Data Collection and Interobserver Agreement**

Data were collected for problem behavior which was defined as any instance of problem behavior occurring as written in her BIP (e.g., aggression, elopement, property destruction, tantrum) during the 1-min whole interval and were recorded as incorrect. On-task behavior was defined as the absence of problem behavior and JD engaging in and responding to demands presented to by the instructor with or without prompts. On-task behavior was recorded as correct in the 1-min whole intervals.

Interobserver agreement (IOA) data were collected for 20% of sessions by a second observer for baseline, condition 9 min, and condition 11 min. IOA was calculated using interval-by-interval IOA in which the number of intervals agreed on was divided by the number of observation intervals occurred by 100. During baseline IOA was 78%, 100%, 100% with an



average of 92%. During condition 9 min, IOA was 100%, and for condition 11 min IOA was 100%.

## **Procedures**

### **Baseline**

During baseline, the therapist brought JD to group and stated, “it’s time for group; sit down”. JD would sit down at the table with her binder, that is used during group, which contain writing name, age, weather, seasons, days of the week, and months. The group was conducted in the following order: Greetings, calendar, activity one, and art. No visual schedule was used during baseline. The therapist used least to most prompting (verbal, partial, full) when JD did not respond after 5s of the instructor delivering group or individual instructions. If problem behavior occurred, the therapist redirected JD to continue with group. The therapist did not provide any praise during each component of the group activities and no consequence was delivered at the end of group. After baseline data were collected across 3 or more consecutive data points, the therapist identified the establish criteria to start the first initial criterion. The first criteria would start at 5 min and would increase every 2 min with the short-term goal being reached at 13 min in group and the long-term goal being 15 min.

### **Intervention**

Intervention was similar to baseline, but during intervention prompting, reinforcement, shaping, and a visual schedule were included. Prior to starting group, the therapist had JD choose what they wanted to work for by choosing from the available options on their choice board. The

choice board contain all the available reinforcers, high and low preferred items. Once JD choose what she wanted to work for, the premack principle was stated, “first group then e.g., outside, iPad, parachute”. The therapist then led JD to her seat, and the session began when the instructor stated, “let’s start group”. While in group, JD was provided with a visual schedule with the different components that would occur in group and her binder as mentioned above. Once JD completed each task on the visual schedule she was provided with verbal praise from the therapist. The therapist stood behind JD two feet away and used least to most prompting (verbal, partial, full) when JD did not respond after 5s of the instructor delivering group or individual instructions. When JD moved onto another activity without the instructor’s permission, the therapist would state “we are waiting for teacher”. When JD participated in group for the specific criteria, without any problem behavior, she was provided with the reinforcer she selected prior to starting group, at the end of group and the session would end. When JD engaged in problem behavior during the interval, the therapist removed the highly preferred items from the choice board and JD had to choose from low preferred items at the end of the group when the session had ended. JD had to engage with the low preferred items for the next 5 min before all other items were available again.

After JD mastered the 11 min condition, a change was added which was providing JD with a sensory chewy toy to replace mouthing and chewing on markers or pencils that were provided to her during group, as seen in Figure 2. Mouthing on objects was a not considered problem behavior and the sensory chewy toy was provided to her due to complying with COVID-19 regulations for safety and sanitation guidelines in the clinic. When JD attempted to or mouthed her markers or pencils, the therapist redirected her to chew on the sensory toy. JD was

able to put it down if she did not choose to use it, but continuous redirection occurred when an attempt was made to chew her markers.

## **Results**

The results of the shaping procedure are illustrated in Figure 5. During baseline there was variability in the data with data points being at low to moderate levels. The first criteria, 5 min, was selected by adding the total amount of time JD tolerated being group and dividing by five. JD was able to participate in the condition 5 min and met mastery criteria, three consecutive data points at 100%, and moved onto 7 min. In the condition 7 min, JD engaged in problem behavior, as illustrated as open circles in Figure 2. JD was able to meet mastery criteria in the condition 7 min and moved onto condition 9 min. JD met mastery criteria in condition 9 immediately and as well as in the 11 and 13 min condition.

## **Discussion**

This shaping procedure, along with the use of prompting, reinforcement, and the visual schedule, were successful in increasing the time spent in group without problem behavior. This case study referenced Azrin et al. (2007) study, in which a shaping procedure was implemented to increase on task behavior in a classroom setting and then reinforcement was delivered contingent on no problem behavior during the entire 15 min instruction session. However, this case study did not train the participants outside of the classroom setting, which was done in

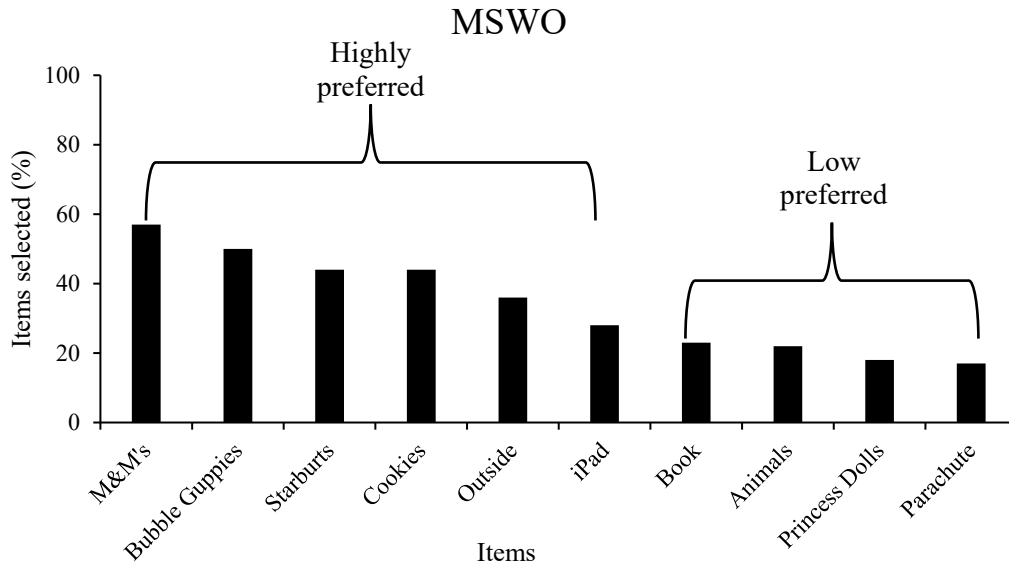
Azrin et al. (2007). Training took place while group was being taught. This case study also had a participant diagnosed with ASD and not ADHD.

One limitation that could have affected the progress of this intervention was reinforcement delivered outside of the intervention procedures. JD attended a group with other peers sitting next to her and therapists in the same room. The instructor that led the small group delivered reinforcement in the form of verbal praise or physical touch, such as a high five or tickles, to the group or individually. Also, the lead therapist would provide physical hand over hand prompting with activities that JD was unable to do independently. Hand over hand prompting would often take up 1 or 2 whole intervals, however this was considered on task behavior. Providing the sensory chewing toy after condition 11 min, could also have provided reinforcement. Reinforcement outside of the procedures and continuous hand over hand prompting could have contributed to the rapid progress seen in conditions 9 through 13 min.

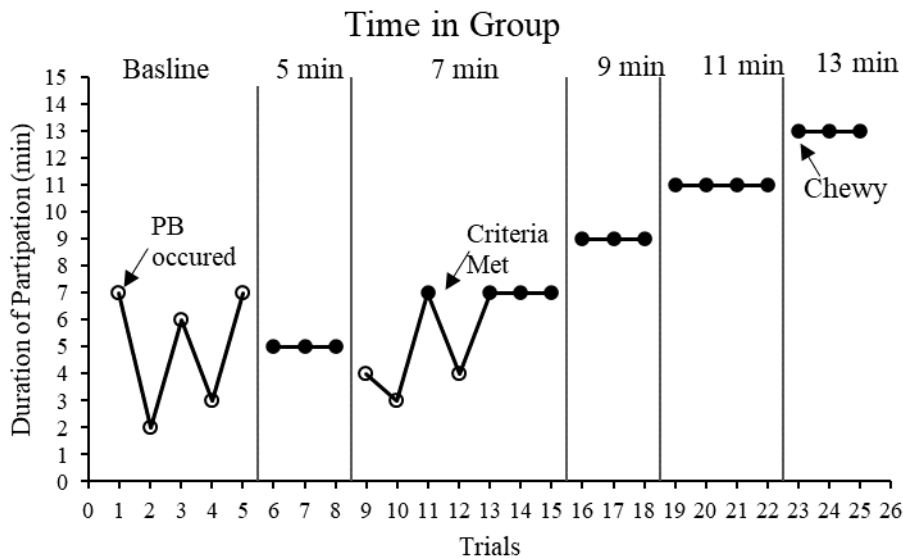
A second limitation that could have affected JD's progress was that she experiences strong symptoms of allergies due to pollen. Since the inception of this case study, JD would come to sessions in the clinic medicated with Benadryl®. Benadryl® includes drowsiness as a side effect. However, outside of the intervention JD, would continue with her normal routines of her session with no issues or signs of sickness.

Overall, the shaping procedure along with the use of prompting, reinforcement, and the visual schedule was successful in increasing the time spent in group. JD was able to make continuous progress, as demonstrated in Figure 5, when she moved from one condition to another without any problem behavior for conditions 9 through 13min. In the future, this

procedure should be implemented in a different setting outside of the clinic, such as the school, to evaluate whether the same procedures would generalize to a different setting.



**Figure 4.** Percent of items selected from the MSWO preference assessment.



**Figure 5.** Duration of participation in group in minutes. Trials are shown on the x; duration of participation in minutes are shown in the y-axis. Open circles represent time where problem behavior occurred. Closed circles represent meeting criteria and no occurrence of problem behavior.

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