DEMAND FADING AS A TREATMENT FOR ESCAPE-MAINTAINED PROBLEM BEHAVIOR IN A CHILD WITH AUTISM

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Abstract

The article presents a research focused on problem behavior reduction in a child with autism spectrum disorder. Based on functional assessment, it was hypothesized that the target problem behavior primary function was to stop a demand or task in progress. We used a single subject experimental design to evaluate the effects of a demand fading procedure to reduce the occurrence of tantrums and self-injury during natural environment teaching sessions. The intervention included removal of all instructional demands and their gradual reintroduction based on a set criterion of low levels of problem behavior occurrence. The results show that withdrawing all demands and subsequent gradual fading in of instructions during teaching sessions may function as a viable antecedent strategy for decreasing problem behaviors maintained by escape.

Keywords: applied behavior analysis, problem behavior, demand fading, autism spectrum disorder

INTRODUCTION

Escape from instructions or demands during teaching sessions has been identified as a maintenance variable for problem behavior in many learners with disabilities. Several aspects of the instructional environment may become aversive and establish escape from instruction or demands as negative reinforcement (Geiger, et al., 2010). Cipani (2018) describes a typical scenario, where a teacher presents a difficult task to a child. Such a demand becomes aversive for the child, as he or she may not be capable of performing it. Therefore, a problem behavior in the repertoire of the child that results in the demand removal serves (a) the immediate purpose (the performance of the unwanted task is postponed or completely avoided) and (b) the problem behavior is reinforced (the probability of the problem behavior occurrence in the future will increase).

What can be considered as a difficult task is relative, and we propose it to be viewed broadly not just as the task complexity, but also as the frequency of presented demands or duration needed for the task performance. Glasberg (2006) describes escape and avoidance as the most common function of problem behaviors seen in schools and other educational settings. These challenging behaviors may vary in their topography, frequency, duration, or magnitude. It is not without exception that they become severe and dangerous to the child or others, including classmates, parents, teachers, or therapists (Durand, 1990).

According to Glasberg (2006), behaviors that pose a danger to self, others, or property shall be considered for behavioral change before addressing less threatening behaviors. This view is in concord with Cooper et al. (2014, p. 82), who advise to prioritize interventions for target behaviors (TB) posing a danger to the individual and, at the same time, behaviors that hinder access to reinforcement or skill acquisition.

Several methods based on the science of applied behavior analysis (ABA) are considered evidence-based interventions for reducing escape motivated problem behaviors. Based on the ABA model of selecting function-based treatments for escape-maintained problem behavior (Geiger et al., 2010), a demand fading procedure consisting of the abolition of all instructional or other types of demands followed by their gradual reintroduction over time of several sessions has been recommended as an antecedent strategy (Pace et al., 1993). The procedure has been widely studied within the last thirty years and proven to be effective in increasing the tolerance of clients for academic as well as other types of demands and activities (Ducharme et al., 1994; Miltenberger, 2006; Shabani & Fisher, 2006; Butler & Luiselli, 2007; Davis, et al., 2018; Stuesser & Roscoe, 2020; Lillie, et al., 2021).

METHODS

Participants and behaviors

The subject in this investigation was a nine-year-old boy diagnosed with autism spectrum disorder (ASD) and mild intellectual disability, who engaged in problem behaviors during natural environment teaching (NET) sessions. We identified the TB to be a set of challenging behaviors demonstrated by Adam (the name of the child has been changed). Behaviors included tantrums consisting of screaming, crying with tears and running nose, kicking the table, and throwing play items and instructional materials (e.g. puzzles, colors, and toys). This TB was typically followed by physical aggression. This included Adam's punching, smacking, biting, or pinching the therapist's legs, stomach, arms, or head and self-injurious behavior (SIB) consisting of biting himself, defined as closure of upper and lower teeth on his hand or arm. Despite different topographies, all the above-described behaviors (dependent variables) served the same purpose of escaping from the environment where the session took place.

The setting events included the child being exposed to a novel environment and therapists of the treatment center being relative beginners in ABA practices. We hypothesized that overestimating the learner's abilities and skills, in other words making the tasks the child was supposed to fulfill during the NET session too many and too complex, led to the occurrence of his problem behaviors. Based on the functional behavioral assessment, we ruled out other possible functions of his challenging behaviors exhibited during the NET sessions. Based on TB's dimensional features, we decided to measure TB's duration during the whole one-hour NET session. The observer recorded the TB by turning on a stop-watch whenever the behavior occurred and pausing it immediately when it ceased. The stop-watch was turned on again when the TB was observed again. By this procedure, we received the total problem behavior duration in a one-hour NET session.

Experimental design

We conducted a brief literature review of studies focusing on demand fading and evaluated the experimental designs used. We found the multiple-baseline across subjects, reversal design, multi-element baseline design (alternating treatment design), or a combination of the above mentioned to be the most prevalent. One of the seminal studies conducted by Pace et al. (1993) and the demand fading research conducted by Ducharme et al. (1994) both combined the multiple-baseline strategy across subjects and reversal design. However, only two out of the three children in Pace's research were subjected to the reversal condition. Even though the authors did not explain this decision, it was evident that the third child in their experiment had been exempt from the reversal condition due to the extreme seriousness of her SIB, which included eye-poking. It would be unethical to return to the pre-treatment condition, as it might cause grave harm to the research participant (Bailey and Burch, 2017).

Other researchers (Piazza et al., 1996; Ringdahl, 2002) experimented with combinations of demand fading and other treatment procedures, for example extinction, differential reinforcement, or non-contingent escape. As they sequentially evaluated multiple methods, they could use the alternating treatment design and thus avoided the necessity to return to the baseline to demonstrate experimental control. Finally, more recent studies (Davis, et al., 2018; Gerow, et al., 2020; Stuesser & Roscoe, 2020; Lillie, et al., 2021) focused on evaluation of treatment packages, where demand fading served as one of the components. These studies used more complex experimental designs including A-B-A-B-C reversal design, nonconcurrent multiple baseline combined with reversal design, and changing criterion within nonconcurrent multiple baseline design, respectively.

As Adam was the only subject of this research and we planned to study the relationship between one dependent and one independent variable (single treatment condition), the multiple-baseline across multiple subjects or alternating more than one treatment was not a feasible design option for our purposes. For this reason, we selected the A-B-A-B reversal design as the most suitable experimental procedure. Cooper et al. (2014) describe this experimental procedure as consisting of an initial baseline phase without intervention (A), where we aim to observe a steady-state of responding. This phase is followed by an intervention phase (B), where the treatment condition (e.g. demand fading) is implemented. The following phase (A) consists of treatment withdrawal (in our case return to pre-treatment high demand condition). After that, the treatment condition (B) is once again reintroduced.

Even though this design may most directly and convincingly prove the functional relation between our treatment and the following behavior change, it has several limitations. It possesses certain risks to the research subjects as well as the research itself. Bailey and Burch (2017) stated that the reversal design is not suitable for behaviors that cannot be easily reversed, which is especially true for newly acquired skills, where reversal would mean "unlearning" of already learned behavior. On the other hand, it is suitable for reversible behaviors, and when intervention is withdrawn and returned to pre-treatment condition, will cause no harm to the research participants.

It is questionable whether the ability to accept more difficult or more frequent demands during NET sessions is reversible behavior. Previous studies using reversal design (Pace et al., 1993; Ducharme et al., 1994; Shabani & Fisher, 2006; Butler & Luiselli, 2007) solved this issue by implementing the reversal condition early in their experiment. They returned to a high frequency of demands (baseline) shortly after the intervention phase began, and only after a limited number of demands were introduced. As the treatment condition progresses, the gap between pre-treatment demand frequencies (baseline) and the faded in demand frequencies (treatment condition) gets close or may even become equal. Therefore, when the number of faded in demands approaches the pre-treatment high demand condition, the possibility of return to baseline becomes impossible to implement.

Treatment procedure

A simple demand fading procedure consisted of eliminating all demands from a one-hour NET session, followed by their gradual reintroduction. Despite several advantages, this procedure is not without drawbacks. Since Adam was a relatively large client and his aggression became severe, the immediacy of TB decrease at the beginning of the intervention, as described by Geiger et al. (2010), seemed to be the most apparent benefit of demand fading procedure. The intervention's potential limitations were logistical difficulties, needs of expertise in demand fading procedures, and most importantly concerns connected with the loss of instructional opportunities. When all demands are eliminated from a NET session at the beginning of the intervention, the frequency of problem behaviors may drop significantly, but the client usually does not learn any new adaptive skills and behaviors. These concerns were addressed by consulting the treatment plan and implementation with an experienced behavior analyst.

At the beginning of the first intervention phase, all instructions were eliminated for the first two 60 minute NET sessions, and there were no demands placed on Adam. The session time was spent by presenting mildly reinforcing activities to the child in a playroom. This was followed by gradually adding (fading in) simple instructional requests during the following sessions. The procedure was aimed at increasing Adam's tolerance for instructions as well as decreasing of his problem behaviors. When demands were reintroduced in session six, only one instructional demand was placed. For the remaining time in the session, we delivered mildly preferred activities based on Adam's choice. This was followed by a session with two instructional demands, which were evenly interspersed within the intervention time. We doubled the number of new demands in the following session only when TB occurred for less than five minutes during the previous session. When problem behavior occurred for more than five minutes, the number of instructions stayed unchanged in the next session. Interobserver agreement (IOA) data were collected across 60% of baseline and 33% of intervention sessions for the target behaviors by two independent observers. Agreement for baseline reached 90% (range 80-100%) and 86% (range 75-95%) for intervention sessions.

RESULTS AND DISCUSSION

The results of the implementation of the demand fading procedure are shown in a line graph with two data paths and two y-axes (fig. 1). The chart presents changes in problem behavior occurrence (dependent variable) relative to changes in the number of demands within one session (independent variable). Visual analysis of the trend, level and variability was conducted to interpret the data and relations between the experimental phases. The line with circle data points shows the duration of problem behaviors observed in each NET session. The second line with triangle data points presents the frequency of demands delivered in one teaching session. The pre-intervention baseline phase shows a high frequency of instructions (demands) placed on Adam. The baseline frequency of demands was 129 per one NET session on average. The baseline also indicates that Adam engaged in problem behavior for 21 minutes per session on average. The first treatment condition shows the beginning of intervention with all demands withdrawn (session four and five) followed by immediate drop in problem behavior. In the following treatment sessions, instructional demands were gradually faded in (reintroduced), while the TB stayed relatively low. The intervention was followed by a brief reversal condition (session nine and ten), where we once again introduced a high frequency of demands. During the reversal-to-baseline, the problem behavior occurrence reached almost the original pre-treatment levels. During the second treatment condition (session 11 to 26), we reintroduced the demand fading procedure, and the TB dropped quickly below ten minutes within one session. Again, we doubled the number of instructional demands whenever Adam engaged in problem behavior for less than five minutes in the previous session. This allowed us to gradually increase the number of demands and reach an average of 177 demands in session 24 to 26 with minimal TB occurrence within the final sessions. The number of demands placed on Adam during the final session reached an average of three per minute, which was in accordance with his behavioral plan. No further increase of demand frequency within the NET sessions was necessary.

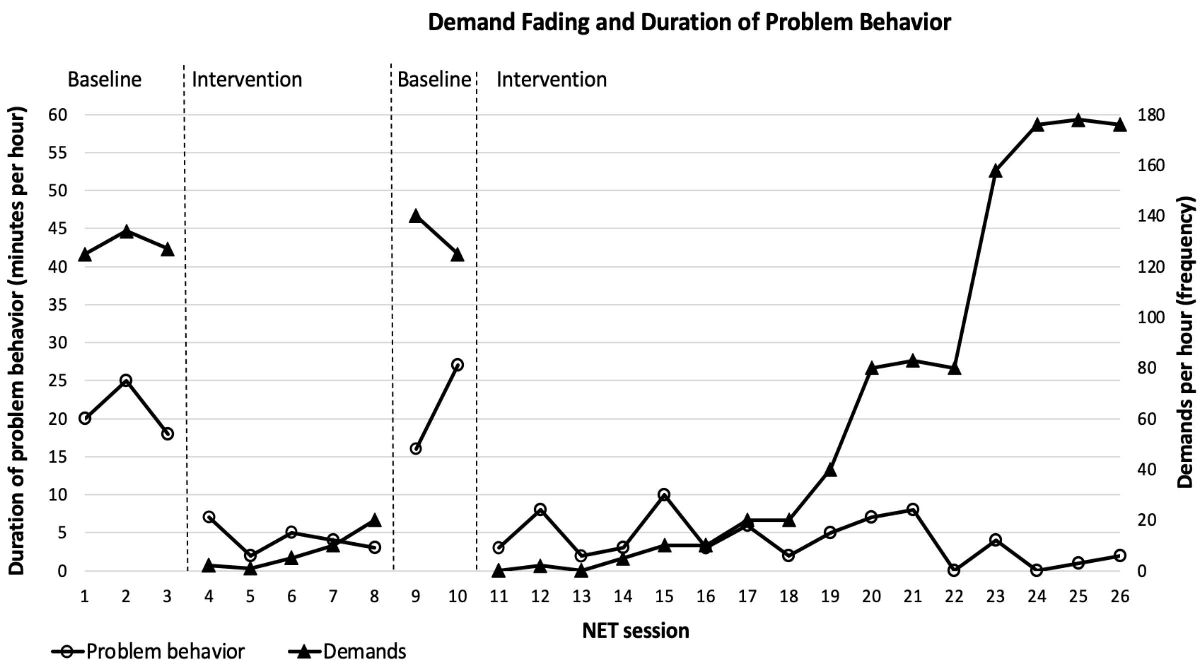

Fig. 1: Duration of problem behavior across baseline and treatment conditions (line with circles). Frequencies of instructional demands across baseline and treatment conditions (line with triangles).

An issue associated with the study's design is the fact that returning to pre-treatment conditions often brings the target behavior back or close to pre-treatment levels. Bailey and Burch (2017) argued that reversal design should only be used when no harm to the participant or others could result. They give examples of face scratching, fire setting, or stealing as behaviors unsuitable for reversal design experimentation. Following this recommendation could prevent all research where SIB or aggression is a possible but improbable outcome of the reversal condition. Cooper et al. (2014) elaborated on this issue more in detail and provided the practitioner or researcher with questions to be considered when applying reversal design. They point out that short pauses in the intervention and return to baseline could be considered in cases of mild SIB and aggressive behaviors. However, the reversal phase should be short, consisting of only a few probes, which can be enough to show a functional relation between the intervention and TB.

With these considerations, we decided to use the design in the study with Adam very cautiously and reverse to baseline for two sessions only. When returning to baseline, we also looked only for the precursor behaviors, which signaled the forthcoming of TB, but were less dangerous (Smith & Churchill, 2002). Adam's tantrums in the form of screaming, crying, kicking the table, and throwing instructional objects served as precursors for more severe and potentially dangerous behaviors. Even though precursors differed in topography from the TB, they were functionally equivalent. As Herscovitch et al. (2009) proposed, the focus on precursor behaviors could reduce the chance of the client's injury. Even though Adam's hand biting and aggression towards instructors was minor (no harm to the individual or the instructors had ever been reported), we did not try to evoke the SIB and aggressive behaviors when withdrawing the intervention and returning to baseline. Therefore, when Adam presented the precursors during the return to baseline condition, we terminated the demand condition to prevent further escalation of TB. We believe that the precursor behaviors during the return-to-baseline condition served as satisfactory evidence of the functional relationship between the independent and dependent variables.

CONCLUSIONS

This applied research project aimed to measure the treatment outcomes of a simple antecedent procedure of demand fading in an eight-year-old client with ASD displaying escape maintained problem behaviors, including aggression and SIB. We used the reversal design to determine whether a functional relationship exists between the demand fading and the client's problem behavior. The results show that withdrawing all demands and subsequent gradual reintroduction (fading in) of instructions during NET teaching sessions may function as a viable antecedent strategy for decreasing the occurrence of problem behaviors maintained by escape.

Reducing the frequency or complexity of instructional or other types of demands and their gradual reintroduction has been used as a stand-alone antecedent intervention as well as part of more complex treatment packages. Gerow et al. (2020) used functional communication training with either instructional demands fading or dense schedule of reinforcement with two clients with ASD manifesting challenging behaviors maintained by escape. The results of their study are in line with our findings and indicate that demand fading was associated with substantial decrease of problem behavior. Unlike dense schedule of reinforcement, demand fading was also associated with more frequent task completion.

The procedure of demand fading has been utilized across a wide variety of problem behavior topographies and escape/avoidance situations. While our study focused on instructional demands naturally occurring during NET sessions (examples of demands for Adam: “Give me,” “Put on,” “What color?”), other researchers evaluated reduction of problem behaviors occurring during instructional demands at school (Butler & Luiselli, 2007), academic task demands at home (Davis et al., 2018), demands to withstand a medical procedure (Shabani & Fisher, 2006) or demands for compliance, e.g., wearing a facemask (Lillie et al., 2021).

It is important to mention that proactive intervention like demand fading should always be based on the function of the target behavior. Several studies (e.g., Smith & Churchill, 2002; Butler & Luiselli, 2007; Gerow et al., 2018) were able to base their choice of treatment on functional analysis conducted prior to initiation of their intervention. This allowed them to rigorously match their intervention with the function of the problem behavior, i.e., escape/avoidance. In our study, we were not able to conduct full scale functional analysis and instead based our assumptions on functional behavior assessment, namely ABC data collection and direct observation.

Our results show that a simple proactive procedure of demand withdrawal and their gradual and systematic reintroduction may lead to reduction of problem behaviors. However, majority of the studies conducted in this area propose combining proactive strategies with additional consequence-based behavioral procedures, including differential reinforcement of socially significant adaptive behaviors, which promote learning and acquisition of new skills necessary for reaching the full potential of the individual.

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