



Treatment of Socially Mediated Compulsive Behavior in a High-Functioning Adolescent with Autism Spectrum Disorder

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Abstract The current study outlines the successful behavioral assessment and treatment of compulsive behaviors in a high-functioning adolescent with autism. After a functional assessment suggested that compulsive behavior was maintained by both social–negative and social–positive reinforcement, we demonstrated effects of functional communication training, differential reinforcement, and extinction procedures on compulsive behaviors using an ABAB experimental design. Rapid reductions in compulsive behavior occurred during treatment across home and community settings.

Keywords Compulsive behavior · Differential reinforcement of other behavior · Extinction · Functional communication training

Repetitive and ritualistic behaviors are a hallmark of both obsessive compulsive disorder (OCD) and

autism spectrum disorder (ASD) and include rigid adherence to routines, perseverative vocalizations, and ritualistic checking (Eilers & Hayes 2015). Among the most frequently used intervention procedures for addressing symptoms of OCD are exposure and response prevention (ERP; Kozak & Foa, 1997), which involve systematically contacting aversive stimuli while the reinforcement that maintains the problematic response is eliminated (i.e., extinction; Craske et al., 2014). These behavioral strategies are often coupled with cognitive-behavioral approaches to modify maladaptive cognitions that may elicit anxiety and serve as setting events to engage in compulsive behavior (Guertin et al., 2022). However, individuals with autism may be less responsive than their neurotypical peers when treated to cognitive behavioral therapy (CBT; Weston et al., 2016), perhaps due to limited skills necessary to reliably describe private thoughts or connect them to overt behaviors (Eilers & Hayes, 2015).

Modifications to traditional ERP plus CBT treatment approaches for individuals with ASD have been documented sparingly (e.g., Guertin et al., 2022). In particular, Vause et al. (2014) used a multiple-baseline design across behaviors to address compulsive behavior in a child with autism. Treatment trials involved a combination of ERP, differential reinforcement of alternative behavior (DRA) in the form of contingent redirection to a specific coping strategy, as well as cognitive therapy in the form of thought restructuring. Although the results suggested

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symptom improvement, conclusions were primarily determined via parent subjective rating scales and not direct observation. In addition, participants needed to adequately tact private events to fully benefit from the therapy. Thus, the purpose of the current study was to extend the literature on the utility of functional assessment in deriving an effective, function-based intervention for an adolescent with ASD and compulsive behavior.

Method

Participant

Charles (pseudonym) was a 16-year-old male with ASD, OCD, intermittent explosive disorder, and attention-deficit hyperactivity disorder. He was a vocal-verbal learner and received an individualized educational plan (IEP) within a general-education classroom. Typical compulsions included checking (e.g., completion of tasks, such as closing doors or drawers), touching or tapping items, ordering, arranging, and repetitive question-asking. Charles was able to communicate broadly about his need to engage in these compulsions, but was unable to tact private events connected to them. Charles had previously failed to make progress through traditional CBT approaches.

Pretreatment data collected by Charles's parents indicated that he engaged in compulsions several dozen times per day. When these responses were blocked or ignored, Charles reportedly engaged in episodes of profanity and verbal aggression. As a result of the compulsions, Charles's adaptive functioning was significantly limited; he regularly refused to leave his room, avoided areas of the house, and refused school. Despite the family's considerable history accessing mental health services, they had no previous history with behavior-analytic approaches to intervention prior to participating in the current intervention. Consent for the use of data for the purpose of professional dissemination was obtained from the parents, and Charles provided assent.

Dependent Measures and Interobserver Agreement

Compulsions were defined as any instance of demands for others to complete ritualistic behavior. Data were

collected using pencil and paper. Additional measures included the Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999), which is a validated 36-item caregiver rating measure used to capture problem behaviors of childhood and was delivered pre- and postintervention. The "intensity scale" measures the frequency of behavior problems and the "problem scale" measures the degree to which the caregiver perceives a specific behavior as a problem. In addition, as a measure of social validity, a caregiver acceptability questionnaire (CAQ) was administered posttreatment, which is a seven-item measure designed to assess caregivers' satisfaction with treatment. Charles's parents were asked to respond to questions using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

Interobserver agreement (IOA) data for compulsions were obtained by a second observer. Data were compared on a trial-by-trial basis, and agreement percentages were calculated by dividing the number of trials with agreement over the total number of trials. If both observers scored a zero (i.e., no observation of compulsive behavior), the trial was scored as an agreement. Quotients were then averaged and converted into a percentage. IOA values were calculated for 80% of all treatment trials and averaged 98% (range: 96%–100%).

Treatment Integrity

Treatment integrity data were collected from video for 50% of treatment trials. Observers determined the number of opportunities to implement specific treatment components and the frequency of correct implementation. Integrity values were calculated by dividing correctly implemented steps by the total number of opportunities, which yielded the following values by component: extinction, $M = 96%$; reinforcement for break requests, $M = 100%$; and communicating the start of practice trials (S-Delta), $M = 90%$.

Procedures

Functional Interview

During the first appointment, Charles and his parents provided information about contexts likely to occasion compulsive behavior (Edelstein et al., [in press](#)). This information was used to create a list of

antecedent events most likely to precede compulsions, as well as the consequences most likely to maintain them. In addition, the interview provided insight into daily living activities that were affected by avoidance.

Treatment Evaluation

An ABAB design was used to evaluate the treatment package. There were an average of 5.5 trials per appointment (range: 3–8 trials), and appointments occurred in person for 2hr/day, 5 days/week for 2 consecutive weeks.

Baseline (“A” phases) consisted of structured descriptive assessment trials (e.g., Anderson & Long, 2002) conducted in a naturalistic context. During each trial, Charles’s mother emitted a triggering response (i.e., setting events, such as providing a reminder or moving items out of order, identified in the functional interview as being likely to evoke target behavior). Contingent on compulsive behavior, Charles’s mother immediately provided escape from the antecedent and attention (e.g., complying with Charles’s demand while saying “ok, I won’t say it”). The baseline suggested that compulsions were maintained by escape (negative reinforcement) and attention (positive reinforcement).

Treatment started with a functional communication training (FCT) training phase. The clinician instructed Charles to ask for a break, prompted the functional communication response (FCR), and immediately reinforced the FCR during initial teaching trials.

After the FCT phase, treatment was a signaled nonresetting differential reinforcement of other behavior (DRO) coupled with exposure, FCT, and extinction. During these phases, FCRs were honored outside of DRO intervals; FCRs during the DRO interval were acknowledged but deferred until after the DRO interval was complete. The DRO interval began at 2 min and was gradually faded to 15 min following two consecutive trials without compulsive behavior and in collaboration with Charles. Interval length was conveyed using a digital timer.

Charles or his parents chose the context before each session from a hierarchical list of anxiety-provoking stimuli generated during the functional interview (see Supplemental Materials). Stimuli were rated collaboratively by Charles and his parents on a Likert scale, with 0 = mildly aversive and 10 =

extremely aversive. As treatment progressed, the clinician limited the number of setting events available for practice, thereby increasing the difficulty of graduated exposure.

At the start of each treatment (“B”) phase, the clinician coached Charles’s parents to articulate the rules (see Supplemental Materials) and start the DRO timer. The parents then started either continuous (e.g., keeping a door open for the entire interval) or intermittent (e.g., providing reminders every 30 s) exposure. Additional exposure components were gradually added (e.g., keeping a door open) once the DRO interval reached 10 min to include additional aversive components based on parent report. Parents withheld attention and maintained the exposure following compulsions (i.e., extinction). If no compulsions occurred during the interval, the parents provided both the functional reinforcer (i.e., escape to a quiet space for 5 min) as well as high quality leisure items (e.g., cell phone).

Generalization

During treatment, clinicians programmed contingencies in the home to support between-session work. In particular, during the FCT-training phase, specific activities were required for Charles to earn a daily allowance, including hygiene routines, chores, and adhering to a schedule. During treatment, practice sessions were included in his daily expectations at home. Parents were asked to include multiple setting events at increasingly higher intensity to facilitate generalization. Finally, to transfer stimulus control of the treatment procedure to the home setting, Charles’s parents signaled the start and end of the DRO interval by wearing a bracelet only during practice.

Results and Discussion

Results appear in Fig. 1. During baseline, Charles engaged in compulsive behavior at every opportunity. During treatment, the probability of compulsive behavior immediately reduced to zero. Except for Trial 55, Charles engaged in appropriate discussion or sat quietly, regardless of the duration of the DRO interval.

Baseline ECBI scores were in the clinically significant range (ECBI Intensity t -score = 70, Problem t -score = 76). Posttreatment ECBI t -scores fell a

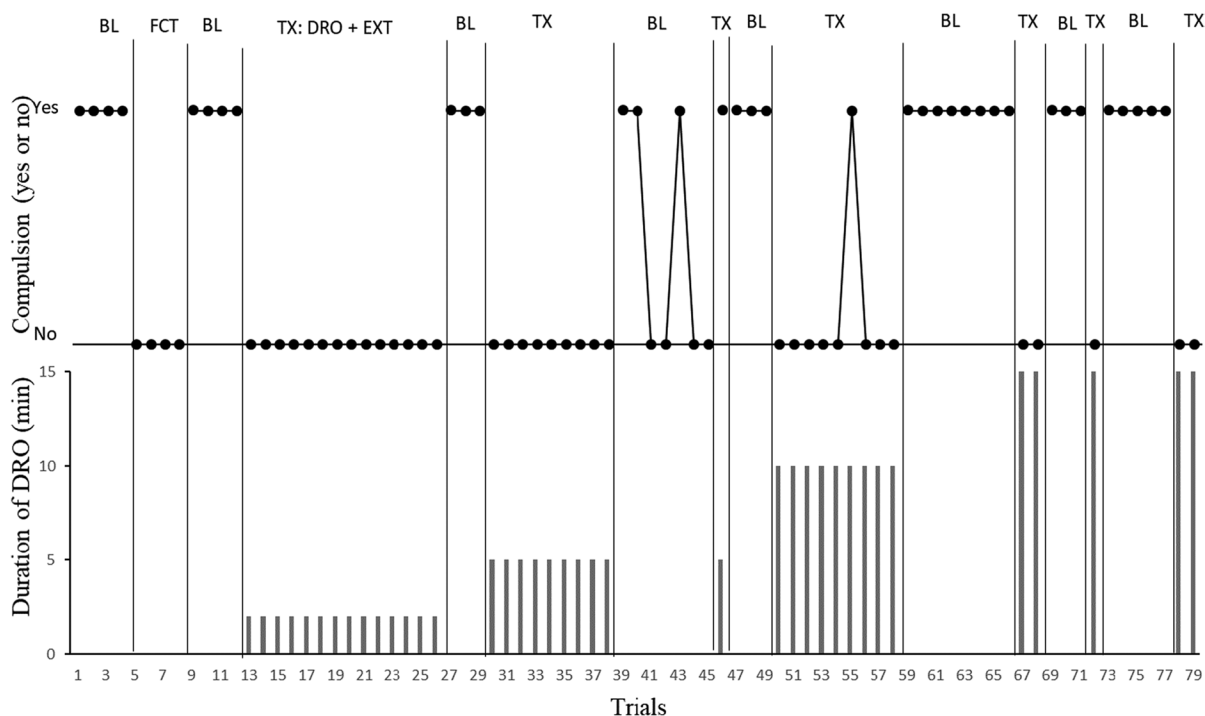


Fig. 1 Results of Charles's Treatment. Note: *BL* refers to baseline phase; *FCT* refers to functional communication phase of treatment; *TX* refers to the DRO + Extinction procedure; Com-

pulsion refers to whether compulsive behavior occurred in a given trial; Duration of DRO refers to interval length

mean of 26% (Intensity t -score = 54; Problem t -score = 54) and were outside of the clinically significant range. Charles's parents provided an average rating of 4.7 of 5 on the social-validity measure.

During the follow-up, data provided by Charles's parents indicated that compulsions occurred during 30% of opportunities across home and community settings. The family reported that Charles had been attending school full-time every day throughout the past week, because the DRO procedure had been extended to include the entire school day.

The current study extends the literature on ERP among individuals with ASD. The extent to which the current treatment procedures were derived from functional assessment (including direct observation and manipulation of antecedent variables) highlights the utility of a function-based approach to treatment. Although the literature on behavioral treatments for compulsions typically assumes social mediation, few studies have sought to confirm through a systematic analysis of environmental variables (e.g., Rodriguez et al., 2012; de Seixas Queiroz et al., 1981).

For Charles, a treatment package including DRO, extinction, and FCT significantly reduced compulsions maintained by both social negative and social positive reinforcement. Perhaps most significant, parents reported that treatment effects were generalized to home and community settings. Data provided at a 1-month follow-up suggested that Charles continued to benefit from treatment strategies. Comparison of pre- and posttreatment ECBI measures suggest meaningful change following treatment procedures. However, it should be noted that recent evaluations (e.g., Martinez et al., 2022) of the psychometric utility of the ECBI suggest it may not be the best measure of interfering behaviors in children with ASD.

Despite long-term treatment gains in home and community, compulsions rapidly returned to baseline when treatment was removed in the clinic. Although this pattern of responding provides evidence of experimental control of the intervention procedures over Charles's compulsive behavior, it also underscores the importance of maintaining a therapeutic environment to promote lasting behavior change. The rapid

recovery of baseline responding suggests a high probability of resurgence (Sullivan et al., 2020).

The results of the current study should be considered within its limitations. First, the study included only one participant. Second, because there was no direct observation of the use of treatment procedures at home or in the community, the external validity of the intervention can only be verified through parent report. Finally, the clinical decision not to attempt to address underlying cognitions, although consistent with the family's expectations, may ultimately hinder long-term generalization. In particular, given the high likelihood of symptom resurgence common among individuals with OCD (Vause et al., 2014), it may have been preferable to include strategies that Charles could use without adult support. Future directions for this line of research should explore ways to increase participant autonomy over treatment procedures, even in cases where they might not be expected from cognitive-based approaches.

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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