Received: 21 January 2022 | Revised: 2 August 2022 | Accepted: 12 September 2022

DOI: 10.1002/bin.1909

BRIEF REPORT

WILEY

Treating elopement without extinction in a preschool setting

Megan A. Boyle[1] | Britnea L. Monaco[2,3] | Lori M. Ebeling[3]

[1]Department of Counseling, Leadership, and Special Education, Missouri State University, Springfield, Missouri, USA

[2]Psychology Department, Missouri State University, Springfield, Missouri, USA

[3]Henry County R-1 School District, Windsor, Missouri, USA

Correspondence
Megan A. Boyle, Upstate Cerebral Palsy, Utica, NY 13502, USA.
Email: Megan.Boyle@upstatecp.org

Abstract

Elopement is a prevalent and dangerous behavior that is common with children with autism spectrum disorder (ASD). Due to safety, logistics, and effort on the part of stakeholders, recent research has emphasized the need for treatments that do not include extinction or response blocking. Using a multiple-baseline-across-functions design, we successfully decreased elopement with functional communication training, without additional treatment components, for one function but needed to add an additional treatment component (response blocking) for the second function for a 4 year-old boy with ASD who engaged in elopement in a preschool setting. We highlight contributions to the literature on elopement as well as directions for future research.

KEYWORDS
elopement, functional communication training, trial-based functional analysis

Elopement, or leaving an area without permission, is a dangerous and prevalent behavior among individuals with autism spectrum disorder (ASD; Anderson et al., 2012). An individual may elope from their home, from public locations (e.g., stores), or from a classroom or other structured program. Elopement is a uniquely dangerous behavior, as the natural consequence of elopement is that the individual is out of reach of a caregiver or teacher. Indeed, elopement is dangerous in that it leads to *other* potentially dangerous situations, including drowning, traffic accidents, and becoming lost (Anderson et al., 2012). Elopement in school settings (either from a classroom within the school or from the school altogether) is a particularly challenging situation, as teachers have other students for whom they are responsible. Teachers may not be aware that a child has left the instructional area or may be unable to leave other students to pursue the one who eloped. According to a survey of caregivers (Kiely et al., 2016), approximately 10% of children with ASD who had eloped within the preceding 12 months did so within structured programs, including

Megan A. Boyle is now affiliated with Upstate Cerebral Palsy, United States. Britnea L. Monaco is now affiliated with Summit Behavioral Services, United States.

schools. In another survey (Anderson et al., 2012), 46% of caregivers of children with ASD reported that their child had engaged in elopement after the age of 4, and of these children, 39% had eloped from classrooms or schools.

Fortunately, applied behavior analysts have developed function-based treatments for elopement. In a review of treatments for elopement following functional analysis (FA), Boyle and Adamson (2017) found that functional communication training (FCT) was the most common treatment for elopement but was always combined with another treatment component, most often extinction (withholding the functional reinforcer contingent on elopement) or response blocking (physically interrupting the response to prevent it from occurring). Of studies implemented in school settings, reinforcement-based procedures (including FCT, differential reinforcement of alternative behavior [DRA], and noncontingent reinforcement [NCR]) were also combined with other treatment components, including extinction and negative punishment (Gibson et al., 2010; Lill et al., 2022).

These additional treatment components present challenges for implementers in school settings. For example, extinction for positively reinforced elopement consists of not allowing access to the reinforcer when elopement occurs. This entails delivering minimal attention during retrieval (for attention-maintained elopement) or ensuring the individual does not access the item to which they elope (for tangibly maintained elopement). Extinction for negatively reinforced elopement consists of continuing to deliver the aversive stimulus that evokes elopement when elopement occurs. Thus, regardless of function, implementing extinction for elopement may be challenging (e.g., it may be difficult to block access to an item before the individual can access it), unsafe (e.g., it is unsafe to allow an individual to elope in a parking lot), impractical (e.g., it may be difficult to transport instructional materials to keep tasks in place while an individual is eloping), or impossible (a static physical location such as a loud gymnasium cannot be relocated with the individual while they elope). Similarly, response blocking requires a teacher to interrupt elopement when it occurs, which may be difficult if the individual elopes quickly, is larger than the teacher, or engages in other forms of problem behavior (e.g., aggression) when elopement is blocked. Finally, negative punishment entails either preventing an individual's access to positive reinforcers for a period of time (timeout) or removing a positive reinforcer from their possession (response cost). Both variations may be undesirable in school settings due to logistical, safety, and potentially ethical reasons (e.g., doing so may result in social stigmatization, additional forms of problem behavior, or loss of instructional time). Taken together, it seems important to evaluate treatment approaches that do not rely on these additional treatment components.

An alternative approach to extinction, response blocking, or punishment in reinforcement-based treatments for elopement is to conceptualize elopement and an alternative response as a concurrent-reinforcement schedule and arrange parameters of reinforcement that favor the alternative response (Athens & Vollmer, 2010; Kunnavatana et al., 2018). For example, Athens and Vollmer (2010) conducted FAs and DRA with seven individuals with developmental disabilities. Instead of simply extinguishing problem behavior (aggression, property destruction, and inappropriate sexual behavior) and reinforcing an alternative response, the authors evaluated changes in problem behavior and the alternative response while manipulating different parameters of reinforcement for both responses. In Experiment 1, participants engaged in the alternative response (compliance and communication) more often than problem behavior when the alternative response produced a longer duration of access to reinforcers compared to problem behavior, even though problem behavior continued to be reinforced. Boyle et al. (2020) used this approach in the treatment of elopement in a clinical setting by arranging differential durations of reinforcer access contingent on elopement and functional communication responses (FCRs) with a boy with ASD. Contingent on elopement, the participant received 3-s access to stereotypy (the maintaining reinforcer for elopement), while contingent on the FCR, he received 1-min access. As with Athens and Vollmer, arranging reinforcer durations that favored the FCR compared to problem behavior successfully maintained low levels of elopement during FCT and schedule thinning.

In addition to treatment, aspects of elopement also complicate its assessment, particularly FA. Elopement is often defined as leaving an area without permission or exceeding a given distance from a therapist (Boyle & Adamson, 2017). Types of FA that rely on repeated measures within sessions can be problematic with these definitions, as the opportunity for elopement to occur needs to be reset following its occurrence. This often involves a prompt from a therapist, which introduces attention as a contingent consequence. This may then influence behavior

in non-attention conditions (e.g., escape), making it difficult to interpret levels of behavior across conditions. Formats of FA that do not require repeated measures within sessions, such as trial-based FAs (TBFAs; Bloom et al., 2011; Sigafoos & Saggers, 1995) and latency-based FAs (Thomason-Sassi et al., 2011), are thus well-suited for the assessment of elopement (Phillips et al., 2018). Following reinforcer delivery in a test condition, the segment (TBFA) or session (latency-based FA) ends, which obviates the need to reset the opportunity to respond. Researchers have evaluated TBFAs and latency-based FAs in the assessment of elopement (Boyle et al., 2020; Kamlowsky et al., 2021; Lambert et al., 2017; Neidert et al., 2013), although demonstrations of TBFA with elopement in school settings are relatively rare (cf. Larkin et al., 2016; Rispoli et al., 2015).

The purpose of this study was to extend the research base on the treatment of elopement without extinction or response blocking in a school-based setting. One special education teacher (the first author, hereafter referred to as the primary therapist) who was accruing hours toward national certification in behavior analysis and one paraprofessional (the third author, hereafter referred to as the secondary therapist) conducted all trials and sessions under the supervision of a doctoral-level board certified behavior analyst (the second author) with a child who engaged in elopement in an early childhood classroom. This study contributes to literature on both the use of differential reinforcement parameters in the treatment of elopement within a graduated treatment model, which begins without extinction, blocking, or punishment and adds treatment components as necessary, and the utility of TBFA with elopement in school-based settings. This type of approach may be especially useful in school settings, where school professionals have limited resources and may be unable to implement extinction, blocking, and punishment with fidelity.

1 | METHOD

The institutional review boards of the affiliated university and school district approved the procedures in the current study. We obtained informed consent from the participant's caregiver and the principal of the participant's school before we began the study.

1.1 | Participant

Patrick was a 4-year-old boy who received a diagnosis of ASD from his pediatrician based on the criteria in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013). Patrick was White, and English was his family's primary language. Patrick demonstrated strengths in the mand, tact, imitation, visual-perception, play, and spontaneous-vocal behavior subtests of Level 1 of the *Verbal Behavior Milestones Assessment and Placement Program* (Sundberg, 2008), with scores of 5.0 out of 5.0 on each of the aforementioned sections. However, Patrick struggled with listener and social behavior, with scores of 1.0 out of 5.0 on listener behavior and 2.0 out of 5.0 on social behavior.

Patrick had a history of elopement both from his home and within the school setting. At school, Patrick had eloped from the building multiple times via a door from his classroom that opened to a parking lot behind the school. He had also attempted to climb the fence surrounding the playground to leave school property during recess. Finally, Patrick also regularly eloped during the after-school transition from the building to the school bus.

Patrick attended preschool in a rural town in Missouri 4 days a week and received 720 min weekly of specialized services, including speech and language therapy, cognitive instruction, and occupational therapy. Patrick's classroom contained 12 students (including Patrick), two paraprofessionals, and two early childhood special education teachers. Patrick's school had not developed a formal behavior plan for Patrick's elopement, although they had arranged several measures to ensure his safety. First, a paraprofessional or one of Patrick's teachers was always within 5 ft (1.5 m) of Patrick when he was in the classroom, and Patrick was always in the line of sight of staff on the playground. Next, when transitioning in the hallway, to the playground, or onto or off the bus, a paraprofessional or teacher held

Patrick's hand to prevent him from eloping. Finally, the school had installed a locking mechanism on the classroom door that opened to the parking lot to prevent him from eloping from the building during classroom instruction.

Trials in the TBFA and treatment sessions were conducted either in Patrick's classroom or a room that the school used for de-escalation purposes with other students (a calm-down room). Patrick's classroom consisted of a large room (7.3 m by 7.9 m) that contained materials commonly found in a preschool classroom (tables, chairs, toys, book shelves, etc.). The calm-down room was approximately 4.0 m by 3.9 m and contained only a child-sized desk and two child-sized chairs. The calm-down room was used with students who engaged in severe behavior, although Patrick had not entered the calm-down room prior to the study.

1.2 | Definitions and measurement

We videotaped all sessions and scored primary data, Interobserver agreement (IOA), and procedural fidelity from video.

Elopement was defined as Patrick taking two steps from the instructional context (i.e., the location where Patrick was seated at the beginning of a trial or session) in any direction without permission and was scored using event recording. During the TBFA, we converted frequencies to percentages of segments with elopement, and during treatment sessions we converted frequencies to response rates (responses per minute). We also scored the latency to the first instance of elopement in both TBFA trials (Dunkel-Jackson et al., 2018) and treatment sessions.

During the TBFA, an *FCR* consisted of an intelligible vocal request for the putative reinforcer being assessed in the trial. During treatment sessions, we defined *tangible FCRs* as Patrick either using a communication card that displayed a picture of the item (touching the primary therapist's arm with the card) or emitting a vocal approximation (e.g., "iPad"). We defined *walk FCRs* as Patrick either using a communication card that displayed a photograph of himself walking or emitting a vocal approximation of "walk around." Further, we scored FCRs as either *prompted* (the primary therapist provided physical and echoic prompts to evoke the FCR) or *independent* (the FCR occurred without a prompt from the primary therapist). We scored all FCRs via event recording and converted frequencies to response rates (responses per minute).

Finally, we scored *response blocking* during automatic-treatment sessions, which we defined as the primary therapist using physical guidance to interrupt Patrick's attempt to elope and guide him back into the chair. We scored response blocking via event recording and converted frequencies to response rates.

1.3 | Interobserver agreement (IOA)

Two data collectors independently scored all dependent variables (DVs) for at least 33% of TBFA trials and treatment sessions to assess IOA. For the TBFA, we randomly selected one trial from each condition and calculated trial-by-trial IOA for elopement. We calculated IOA for latencies by comparing observers' data in each segment, dividing the smaller recorded latency by the larger, and multiplying the quotient by 100 to yield a percentage. Segments in which elopement did not occur did not contribute to the latency-IOA calculation. Trial-by-trial IOA was 100%, and the mean IOA for latencies was 91.6% (range, 80%–100%).

For treatment sessions, we randomly selected 33% of tangible-FCT sessions and 33% of automatic-FCT sessions and calculated exact-count-per-interval IOA for prompted and independent FCRs, elopement, and response blocking. Mean IOA scores were high across DVs: 100% for all DVs during tangible-FCT sessions; 96.5% (range, 93%–100%) for independent FCRs, 98.3% (range, 93%–100%) for prompted FCRs, and 100% for both elopement and response blocking during automatic-FCT sessions.

1.4 | Procedural fidelity

We evaluated procedural fidelity for 33% of TBFA trials to ensure fidelity of the TBFA. As with IOA, we randomly selected one trial of each condition and evaluated fidelity of implementation of arranging antecedents, providing

consequences, and terminating trials. Procedural fidelity was 100% for all conditions and segments with the exception of the escape condition (with an integrity score of 75%), in which more than 5 s elapsed between prompts within the test segment.

1.5 | Experimental design

We conducted the treatment evaluation in a multiple-baseline design across behavioral functions with an embedded reversal within the tangible-FCT evaluation. Intervention sessions were conducted across 2 consecutive months, with a holiday break of 6 weeks that occurred approximately 1 month into treatment. We conducted sessions concurrently (i.e., we did not teach one FCR to mastery before addressing the other function), 1–4 times per day and 1–3 days each week.

1.6 | Procedures

1.6.1 | Indirect assessment

To identify conditions to evaluate in the TBFA, the primary therapist completed an indirect assessment (Matson & Vollmer, 1995). Results of the indirect assessment implicated multiple variables, including attention, escape, non-social, and tangibles. These variables were then evaluated systematically in the TBFA.

1.6.2 | Preference assessment

To identify a highly preferred item for tangible trials and tangible-FCT sessions and a moderately preferred item for attention trials, we conducted a multiple-stimulus-without-replacement (MSWO; DeLeon & Iwata, 1996) preference assessment each day during which TBFA trials or treatment sessions were conducted. To decrease the likelihood of a false-positive tangible function (Rooker et al., 2011), we included only items to which Patrick reportedly eloped or those that he reportedly engaged with independently. Items were rank ordered for preference according to their selected percentages. The item(s) with the highest levels of selection (more than 70% of trials presented) were used in the tangible trials and tangible-FCT sessions, and the items with moderate levels of selection (30%–50% of trials presented) were used during the attention trials.

1.6.3 | Trial-based functional analysis

We conducted the TBFA with procedures similar to those described by Bloom et al. (2011) except that, because Patrick's elopement disrupted other students' instruction, we did not embed trials into naturally occurring activities. Instead, we identified blocks of time during which trials could be conducted while other students were in the adjacent classroom or when the calm-down room was available for use. We conducted all trials except ignore trials in Patrick's classroom. We conducted ignore trials and associated treatment sessions in the calm-down room. The door to the calm-down room was shut during sessions. During assessment and treatment sessions that occurred in the main classroom, the other students and staff in Patrick's class were relocated to the classroom adjacent to the main classroom. During assessment and treatment sessions that occurred in the calm-down room, the other students remained in the main classroom.

All trials consisted of two 2-min segments. The control segment consisted of noncontingent access to the putative reinforcer, and the test segment consisted of the primary therapist arranging the establishing operation for the putative reinforcer. If elopement occurred during a control segment, the primary therapist waited 5 s before

beginning the test to prevent adventitious punishment for elopement. If elopement did not occur during a control segment, the test segment was initiated immediately following the control. If elopement occurred during a test segment, the putative reinforcer was immediately delivered for 30 s and the segment was ended. To assist Patrick in discriminating the programmed contingencies across trial types in the classroom, we conducted trials of each condition in a distinct area of the room.

The second author used behavioral skills training (BST; DiGennaro Reed et al., 2018) to train the primary therapist to conduct TBFA trials (i.e., described the rationale for the conditions, modeled antecedent and consequences, and provided positive and corrective feedback during trials) to a mastery criterion of 100% correct independent implementation of all steps across conditions. The second author was present to deliver instruction and feedback for the first trial of each condition but was not present for remaining trials.

We conducted tangible trials with the primary therapist seated next to Patrick on a rug in his classroom. During the control segment, Patrick had noncontingent access to the highly preferred item identified in the MSWO, and the primary therapist responded to Patrick's bids for attention. During the test segment, the primary therapist removed the item from Patrick and handed it to the secondary therapist, who placed it on a table approximately 2.4 m from the instructional context. If Patrick eloped during the test segment, the secondary therapist guided Patrick to the item (or allowed access if he eloped directly to it) and provided 30-s access to the item, and the trial was terminated.

We conducted attention trials at a desk with the primary therapist seated across from Patrick in his classroom. During both control and test segments, Patrick had noncontingent access to a moderately preferred item identified in the MSWO. In the control segment, the primary therapist provided vocal attention at least once every 10 s and responded to all bids for attention. During the test segment, the primary therapist stated that she had some work to do and diverted her attention. If Patrick eloped during the test segment, the primary therapist provided a brief vocal reprimand and the trial was terminated.

We conducted escape trials at a desk, but in a different area of the classroom as attention trials, with the primary therapist seated across from Patrick. During the control segment, no demands, materials, or attention were provided. During the test segment, the primary therapist delivered writing instructions (e.g., drawing shapes) with a three-step prompting hierarchy (vocal, model, and physical). If Patrick eloped during the test segment, the primary therapist removed the instructional materials and allowed a 30-s break, and the trial was terminated.

Each ignore trial consisted of two 2-min segments regardless of elopement. Ignore trials began with the primary therapist prompting Patrick to sit in a chair next to her. No materials, instructions, or attention were provided throughout the trial. When the test segment began (2 min into the trial), if Patrick was not seated next to the primary therapist, she used three-step prompting to guide Patrick to the chair but continued to ignore subsequent instances of elopement. We chose to use a separate room (i.e., the calm-down room), specifically one devoid of items, for ignore trials, because we wanted to allow Patrick to move around the room throughout each trial without needing to intervene to prevent him from engaging with items. Patrick did not have experience in the calm-down room prior to the study (i.e., he did not have a history of reinforcement or punishment in this room).

We conducted a minimum of three trials per condition and conducted trials of a given condition until responding was consistently differentiated between control and test segments. A social function was indicated when elopement occurred more frequently in test segments relative to control segments. An automatic function was indicated when elopement consistently occurred in both test segments or occurred more frequently in the second test segment relative to the first. We never conducted trials of the same type back to back, and at least 5 min elapsed between trials that were conducted on the same day. We completed the TBFA in 3 days, with two to five trials conducted per day, for 12 total trials.

1.6.4 | Intervention

Data from the test segments of the tangible condition of the TBFA served as baseline for the tangible intervention, and data from both segments of the ignore condition of the TBFA served as baseline for the automatic intervention.

Functional communication training. Because Patrick did not emit any FCRs during the tangible or ignore trials of the TBFA, we chose to implement FCT for both tangible and automatic functions. Sessions lasted 5 min and were identical to the respective TBFA condition, with the following exceptions. First, the primary therapist prompted Patrick to emit the relevant FCR according to a progressive time delay that increased by 5 s across each session, beginning with a 0-s delay (i.e., 0 s, 5 s, 10 s, etc.). Next, elopement initially resulted in differential access to the relevant reinforcer (3 s contingent on elopement, 30 s contingent on an FCR) in both treatments, although response blocking was eventually added to automatic FCT. The relevant reinforcer in tangible sessions included the highly preferred item identified via the daily MSWO, and the relevant reinforcer in automatic sessions included sensory stimuli produced by Patrick walking around. Finally, sessions did not terminate contingent on elopement and instead lasted 5 min. As with the TBFA, the second author used BST to train the primary therapist to conduct FCT sessions.

Tangible sessions occurred with Patrick and the primary therapist seated next to each other on the same rug in his classroom as during the tangible trials of the TBFA, with the secondary therapist standing approximately 0.6 m from them. Prior to sessions, we provide Patrick with 1-min access to the high-preferred item from the daily MSWO. When the session began, the primary therapist removed the item and handed it to the secondary therapist, who placed the item on the table 2.4 m from the instructional context, and the primary therapist used physical and echoic prompts to prompt the FCR. Contingent on either a prompted or an independent FCR, the secondary therapist immediately returned the item to Patrick for 30 s. After 30 s, the primary therapist again removed the item from Patrick and handed it to the secondary therapist to place on the table, and the prompting sequence began again. If Patrick eloped, he received 3-s access to the item and the primary therapist guided him back to the instructional context by placing her hands on Patrick's shoulders and guiding him back to the rug. We demonstrated experimental control within tangible FCT with a reversal probe in which contingencies were identical to the tangible condition of the TBFA. To facilitate Patrick's discrimination of the change in contingency, the communication card was not present during the reversal probe. During the replication of FCT, we reintroduced the communication card but did not include prompts for the FCR.

Automatic sessions occurred with Patrick seated at the table in the calm-down room next to the primary therapist, who used physical and echoic prompts to prompt the FCR. Contingent on either a prompted or an independent FCR, the primary therapist immediately turned Patrick's chair 90° from the table to indicate the availability of reinforcement (i.e., stimuli produced by him walking around). After 30 s, the primary therapist used the least amount of physical prompting necessary to guide Patrick back to the table, and the prompting sequence began again. Initially, if Patrick eloped, he was allowed to walk around for 3 s before the primary therapist prompted him back to the table. However, Patrick began eloping at higher rates and at shorter latencies across FCT sessions. Thus, we added response blocking, which consisted of the primary therapist using physical guidance to interrupt elopement and guide him back into the chair. After tangible-treatment sessions, Patrick went to recess. After automatic-treatment sessions, the primary therapist walked Patrick back to his classroom and resumed instructional programming.

2 | RESULTS

Results from the TBFA are displayed in Figure 1. The top panel displays the percentages of trials with elopement across conditions. The bottom panel displays latencies across trial segments. Open bars and data points represent elopement in control segments, and closed bars and data paths represent elopement in test segments. Recall that trials of a given condition did not occur sequentially, but they are displayed as such in the bottom panel of Figure 1 for convenience of visual inspection. Data points in the no-response section of the bottom panel of Figure 1 reflect the absence of elopement (e.g., no elopement occurred during control segments of the tangible condition, segments 1, 3, and 5).

In the tangible condition (Figure 1, top panel, tangible condition; bottom panel, segments 1–6), Patrick engaged in differentiated elopement across control and test segments, with elopement only occurring in the test segments,

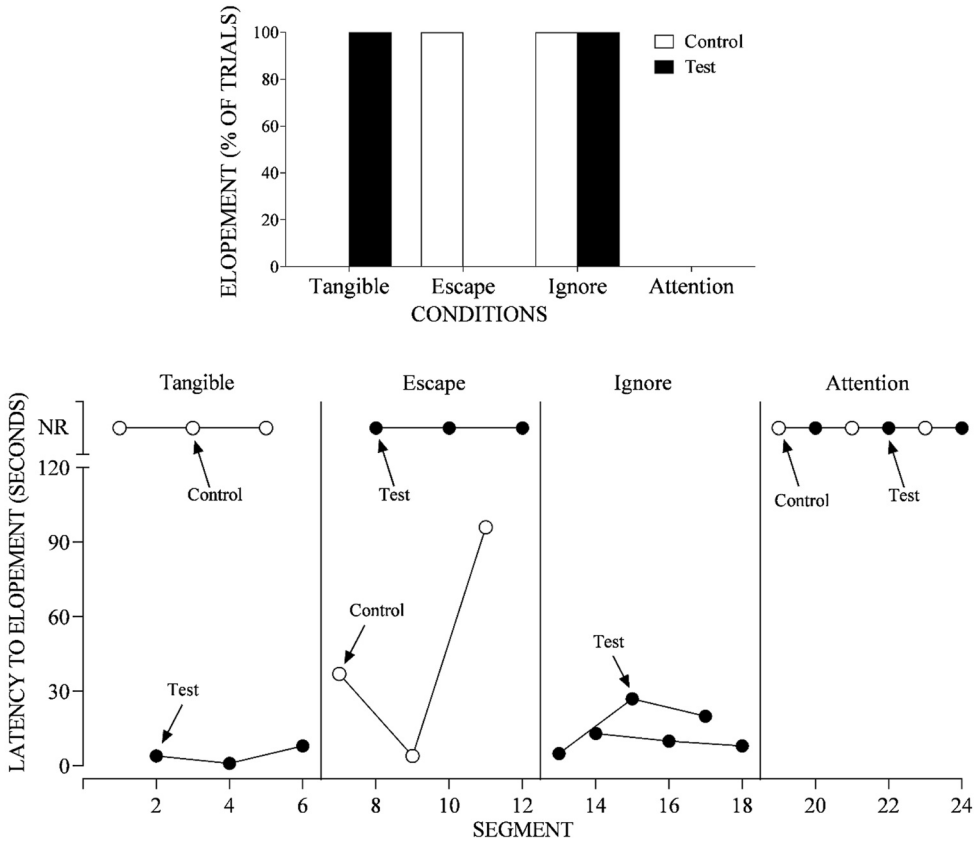


FIGURE 1 Results of the trial-based FA (TBFA). The top panel displays the aggregation of the TBFA data across all trials and conditions. The bottom panel displays latencies to elopement across TBFA segments

indicating a tangible function. Conversely, in the escape condition (Figure 1, top panel, escape condition; bottom panel, segments 7–12), he eloped in only the control segments. Further, in all three control segments of the escape condition, Patrick eloped toward preferred activities that were not used in the TBFA, providing additional support for a tangible function. We blocked access to items or immediately removed them from Patrick when he eloped toward items in escape trials. In the ignore condition (Figure 1, top panel, ignore condition; bottom panel, segments 13–18), Patrick eloped in each ignore segment, which suggested that his elopement was also sensitive to nonsocial reinforcement. Finally, in the attention condition (Figure 1, top panel, attention condition; bottom panel, segments 19–24), he did not elope in either segment.

Results from FCT are displayed in Figure 2. Note that elopement panels (the second and fourth panels) display latencies to the first instance to elopement in the trial or session (all phases) as well as responses per minute in parentheses when elopement occurred (FCT sessions only). Recall that we also scored response blocking, which is similarly displayed in terms of latency, with rates in parentheses (fourth panel). Data points within the no-response area at the top of latency panels indicate that no elopement occurred.

During tangible FCT (Figure 2, top two panels), Patrick acquired the tangible FCR in six sessions and only eloped during one session in FCT (second panel, session 6). In the return to baseline (session 10), he eloped after 6 s (second panel) and did not emit an FCR (first panel). In the return to FCT, his FCRs recovered and elopement did not occur (top two panels, sessions 11–13). During automatic FCT (Figure 2, bottom two panels), Patrick began emitting independent FCRs, and elopement was initially eliminated (sessions 7–9). However, elopement occurred midway through the phase (fourth panel, session 10) and began occurring at shorter latencies and at higher rates (sessions 11–12).

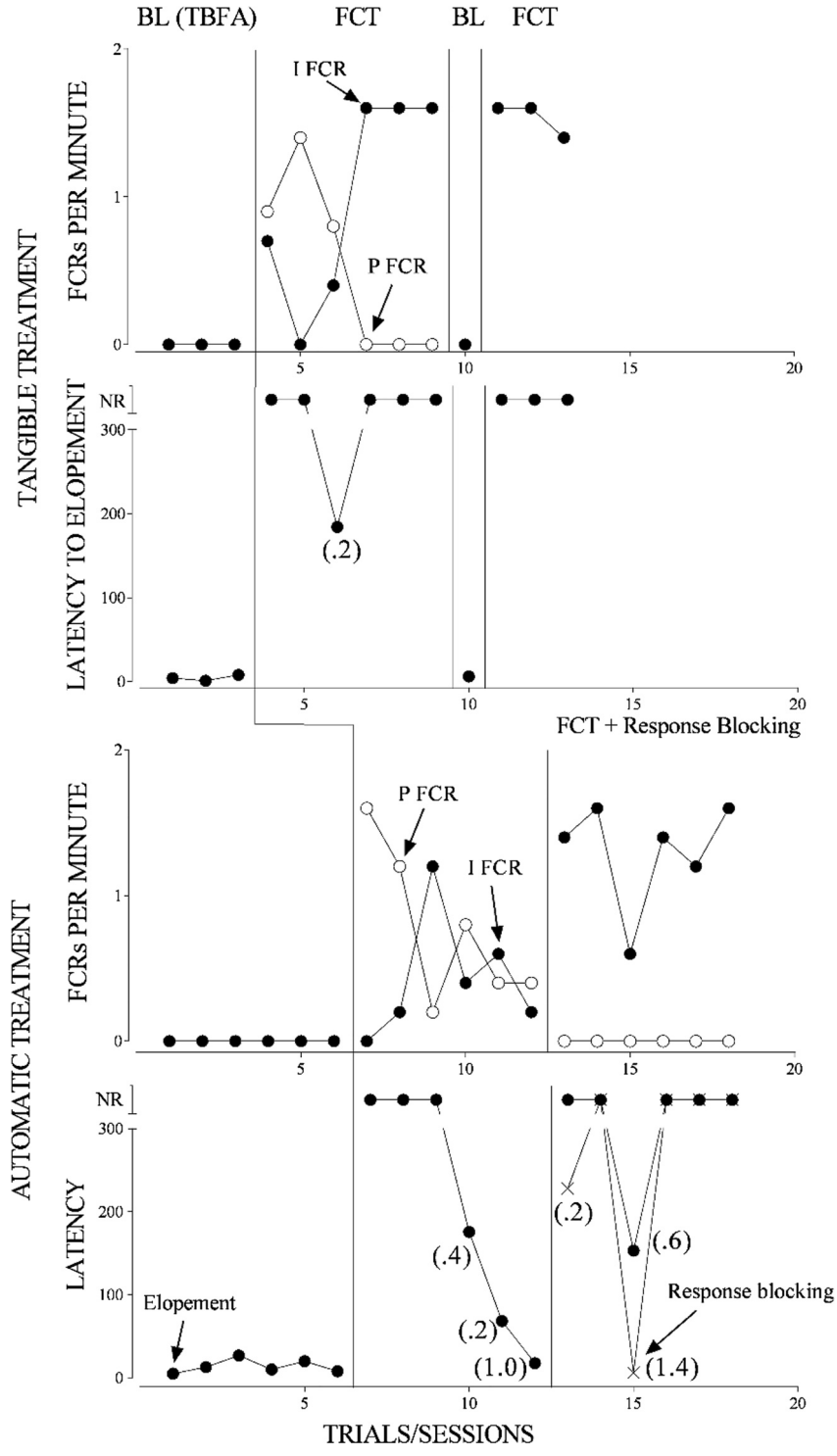
Therefore, we added response blocking to FCT, which resulted in an increase in independent FCRs and an eventual elimination of elopement (sessions 13–18).

3 | DISCUSSION

The current study extends research on treatments for elopement that do not require extinction, punishment, or response blocking, given the safety and logistical challenges with those treatment components with this particular response topography. We evaluated the practicality of a relatively brief TBFA and the efficacy of a less-to-more intrusive treatment model for the elopement of a child who engaged in multiply controlled elopement. We successfully treated one function (access to tangibles) without additional treatment components but needed to add an additional treatment component to the other (automatic). We chose response blocking as the additional treatment component over extinction or negative punishment because of the nature of the automatic function. We hypothesized that Patrick's elopement in this context was maintained by proprioceptive consequences produced by walking, given the results of the TBFA. Extinction would consist of allowing him to walk while also preventing those reinforcers, which would have been challenging given that we had not conducted an analysis of exactly which automatically produced consequences (e.g., movement of the legs, contact with feet on the ground, feeling of air on the face) were the maintaining reinforcers and, in any case, it would be logistically difficult to withhold those reinforcers contingent on behavior. We were not using any programmed positive reinforcers in this condition, and thus negative punishment was not possible. Therefore, response blocking seemed to be a reasonable treatment addition. Decreases in elopement over time as a result of response blocking could implicate either extinction or punishment processes (Lerman & Iwata, 1996). For example, an individual might begin to engage in elopement but be interrupted, which would prevent contact with the response's maintaining reinforcer. A decrease in the future frequency of elopement, especially if accompanied by a gradual decrease in responding over time, may implicate the process of extinction. On the other hand, response blocking might be considered a stimulus change, and, especially if accompanied by a relatively immediate suppression in responding, may implicate the process of positive punishment. With the introduction of response blocking in the current study, elopement decreased relatively quickly (in three sessions), suggesting that blocking may have been effective via punishment.

This study adds to the growing literature base on using differential reinforcement within concurrent schedules during treatment for elopement. To our knowledge, only one other study (Boyle et al., 2020) has used this approach to treat elopement, and this study presents data that suggest that such an approach may have idiosyncratic effects within individuals, as it was effective with one function (tangibles) but not another (automatic). Boyle et al. (2020) and the current study were successful with the reinforcer parameters of duration for access to stereotypy and tangible functions, respectively, but the current study needed to incorporate an additional treatment component for automatic reinforcement. Previous research (Athens & Vollmer, 2010) has evaluated the separate and combined effects of reinforcer-parameter manipulations of delay, quality, and duration and found that effects were largest and most consistent when multiple parameters were manipulated simultaneously (e.g., reinforcer delay, quality, and duration favored FCRs compared to problem behavior). Such an approach could be investigated with automatically maintained behavior but would be complicated by the fact that the reinforcers for such behavior are not socially mediated. In other words, it is difficult to manipulate delay or quality of reinforcement when the behavior itself produces the reinforcers. Researchers could evaluate ways of identifying preference or reinforcing value of different variations of the behavior, which, for Patrick, might have looked like evaluating preference between different areas for walking or with other items or types of attention available. In any case, investigating the utility of reinforcer-parameter manipulations in the treatment of elopement is an area for future research.

The current study is also one of few published reports for elopement that persists in nonsocial conditions of an FA, which is a relatively unique outcome in the elopement literature (10% of cases in the review by Boyle & Adamson, 2017). In fact, the authors are aware of only one other study that reported a treatment for elopement that



may have been automatically maintained (Boyle et al., 2019). Automatically maintained behavior may be especially challenging to address for a variety of reasons, including the fact that the individual is able to control the exact nature of the reinforcers by engaging in the behavior in different ways (Rapp, 2008). For example, a child may run faster or slower or may exaggerate different movements of the body, and doing so may produce qualitatively different proprioceptive stimuli. Future researchers may continue to identify the unique challenges that occur when treating automatically maintained elopement and evaluate effective and practical treatment strategies for that particular function.

Although results of the TBFA suggest a partially automatic function, it is possible that elopement in that condition reflect a false-positive outcome (i.e., an incorrect indication) and that elopement instead was solely maintained by tangibles. If this were the case, however, we would not expect elopement to maintain or FCRs to increase in the automatic-treatment context, given that items were never available in the calm-down room (where the automatic assessment and treatment took place). Instead, we would expect to see a decrease in elopement, as it would contact extinction in the form of not accessing tangibles, and a failure to acquire the FCR. However, this did not occur—elopement maintained until we added a response-blocking component to the intervention and Patrick eventually acquired the FCR, which suggests that the consequences produced by elopement itself functioned as reinforcers. Relatedly, one may also question the notion that elopement can be maintained by nonsocial consequences at all, given that elopement is broadly defined as "leaving an area without permission," with permission dictated by another person, and the antecedent condition to elopement across FA conditions is typically the instruction from a therapist to remain in a given area. The instruction to remain in a given area is provided to ensure that there is a clear expectation for the individual to remain in that area, which is what makes *leaving* that area problematic in the first place. This may indeed insert a confound of escape across conditions, but we believe this is due to the nature of elopement as a problematic behavior and not something to attempt to isolate. There is no theoretical reason why a response may not produce its own reinforcers but happens to occur following an instruction to engage in incompatible behavior (i.e., the instruction to remain in an area, which is incompatible with elopement). What may be useful is a taxonomy of elopement that considers these nuances. For example, in their diagnostic system for problem behavior, with respect to positive reinforcement, Cipani and Cipani (2017) first distinguish *socially mediated* from *direct-access* functions, with the former consisting of others delivering adult/staff attention, peer attention, and tangibles, and the latter consisting of the behavior directly producing or resulting in sensory stimuli and tangible reinforcers. Such a taxonomy distinguishes between behavior that directly accesses stimuli and behavior that accesses stimuli through the mediation of another person, analogous to nonverbal and verbal behavior (Skinner, 1957). It could also be the case that a synthesized contingency was operating for Patrick in the ignore condition of the TBFA and the automatic treatment, with some combination of direct access to sensory stimuli (i.e., proprioceptive stimuli produced by walking) as well as direct escape (per Cipani & Cipani, 2017; i.e., leaving the area resulted in terminating the stimuli associated with that area). Indeed, those authors describe leaving an area without permission following an instruction as "direct escape" (p. 56). Thus, future researchers in this area may clarify and expand this taxonomy to the topography of elopement to facilitate consistent discourse across researchers and clinicians.

This study also adds to literature on the use of TBFAs in school settings. We were able to conduct relatively few trials per condition, as the data were extremely stable. We set out to conduct at *least* three trials per condition, with the caveat that more may have been needed if data were variable. This should be considered when deciding whether to conduct an FA of any type in a school-based setting (i.e., a minimum number of trials or sessions). An alternative model may be to isolate the most likely function based on indirect assessment results (e.g., confirm or

FIGURE 2 Results of functional communication training (FCT). The top two panels display results from FCT for the tangible function (functional communication responses (FCRs) per minute on the top, and latency to elopement on the bottom). The bottom two panels display results from FCT for the automatic function (FCRs per minute on the top, and latency to elopement and response blocking on the bottom). Numbers in parentheses below data points in latency panels indicate responses per minute for the session. BL = baseline; TBFA = trial-based functional analysis; I FCR = independent functional communication response; P FCR = prompted functional communication response; FCT = functional communication training

rule-out a tangible function via a TBFA or pairwise FA) and move directly into treatment before or instead of evaluating all other possible conditions. This may be especially useful in cases in which assessment time is limited and there may be resistance to or skepticism of the utility of FAs in school settings. Because multiple variables were implicated in Patrick's indirect assessment, we chose to directly evaluate the influence of multiple variables. Although we scored latency across segments, we specifically chose a TBFA format over a latency-based analysis because of the relevant test-control comparison during the analysis. During latency-based FAs with multiple test conditions and an omnibus control, all conditions need to be conducted whenever a teacher conducts sessions. Conversely, a logistical advantage of TBFAs is that only the relevant control segment needs to be conducted prior to a test segment on any given day a trial is conducted. This allows teachers more flexibility in conducting trials, as it only requires them to allocate a maximum of 4 min to conduct each trial, which contrasts with a maximum of 25 min (four test conditions, one play condition) during a session-based analysis.

An additional contribution of the current study was to target "walk around" and the corresponding consequence (walking around the room) as the FCR and reinforcer. When behavior is maintained by automatic reinforcement, typical courses of intervention include NCR (to compete with or substitute for the reinforcers produced by the behavior; e.g., Piazza et al., 1998) or differential reinforcement of other or incompatible behavior, often with response blocking (Rapp & Vollmer, 2005). We chose FCT to produce access to the behavior itself, as the behavior of elopement is generally only a problem because it occurs without the permission of a caregiver. In other words, the topography (running or walking) itself is not harmful, but doing so without permission and out of sight of caregivers can be problematic and result in accidents (drowning, traffic accidents) or other undesirable situations (abduction). Indeed, exploring one's environment is developmentally appropriate for children up until the age of 4, but we targeted this form of behavior with Patrick because it had resulted him leaving buildings, including his home, without caregivers' knowledge. Although NCR may have been a viable option, especially given that no elopement occurred in high-stimulation segments of the TBFA, we targeted an increase in communication for Patrick because of his struggle with manding. We believed that a consequence-based treatment that resulted in the acquisition of a skill (requests) was preferable to an antecedent-based intervention that suppresses behavior immediately through an abolishing operation but has no lasting benefit in terms of skill acquisition. Future research may expand this treatment approach with individuals who engage in automatically maintained elopement, perhaps incorporating relevant learning opportunities into activities that include high levels of proprioceptive stimulation.

Other areas for future research may be to replicate the proposed model to evaluate its generality with other individuals and in other settings (e.g., residential facilities, home settings) in which it may be difficult for clinicians to implement extinction, punishment, or response blocking. It may also be useful to evaluate a practical method of schedule thinning (Hagopian et al., 2011) following FCT, as we were unable to do so. Finally, it may be useful to evaluate this approach using a pyramidal (e.g., Kunnavatana et al., 2013) or consultative (e.g., Andersen et al., 2010; Mueller & Nkosi, 2007) model to further increase efficiency and to identify modifications that may need to be made (e.g., elopement maintained by synthesized contingencies or escape from specific instructional contexts).

Notwithstanding the contributions of the current study, there are a few limitations. Due to time constraints, we were unable to thin the reinforcement schedule from continuous reinforcement to something more practical (e.g., a multiple schedule). Patrick's teacher began a multiple schedule (Hanley et al., 2001) following FCT with the tangible function but was unable to complete schedule thinning due to the coronavirus pandemic and the end of the school year. A second limitation is that we did not demonstrate experimental control with the treatment for the automatic function (FCT with response blocking). Although we demonstrated experimental control with the tangible function with a reversal design, we implemented a multiple baseline across functions. Upon implementation of treatment for the automatic function, elopement immediately decreased and low levels of FCRs occurred, but as we faded out our prompts, this relation switched and elopement increased while FCRs decreased (until we added response blocking), which had immediate effects on both elopement and FCRs. Future research might ensure control is demonstrated by embedding reversals within larger designs when appropriate (e.g., a reversal might be embedded within a multiple baseline across functions if additional treatment components need to be added for certain functions).

An additional limitation of the current procedures is that we did not obtain assent from Patrick. This is a limitation of the literature on elopement in general and is an area for improvement for practitioners and researchers when they target this response topography. A promising approach may be the one described by Rajaraman et al. (2022) in which the therapeutic area is designated into "practice" (i.e., treatment sessions) and "hangout" (i.e., noncontingent access to reinforcers) areas, and learners can move into each space to choose the contingency they experience.

Final considerations include limitations related to external validity of both the TBFA and the treatment approach. Although we isolated variables that influenced Patrick's elopement in the TBFA, we did so by arranging the assessment space in manner more contrived than is typical for TBFAs (relocating his peers and deliberately arranging trials). It is unclear whether we would have obtained the same outcomes had we conducted the TBFA in a more typical manner (interspersing trials into daily activities without modifying the assessment space). Further, we were unable to evaluate the extent to which the results of the treatment generalized outside of sessions or occurred with participants of similar or dissimilar profiles. Both areas will be important for researchers to investigate in evaluating the generality of the findings of the current study.

ACKNOWLEDGMENT

We declare no funding. We thank Patrick and his family for their participation in the study.

CONFLICT OF INTEREST

The authors report no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

ETHICS STATEMENT

The current study was approved by the affiliated university's and school district's institutional review boards and was performed in accordance with the ethical standards specified by the 1964 Declaration of Helsinki and its amendments. Informed consent was obtained from the participant's legal guardian and relevant school personnel prior to participation.

ORCID

Megan A. Boyle https://orcid.org/0000-0002-5301-855X

REFERENCES

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Andersen, M. N., Hofstadter, K. L., Kupzyk, S., Daly, E. J., III, Bleck, A. A., CollaroJones, K. E., Clure, L. F., & Blevins, C. A. (2010). A guiding framework for integrating the consultation process and behavior analytic practice in schools: The Treatment Validation Consultation model. *Journal of Behavior Assessment and Intervention in Children*, *1*(1), 53–84. https://doi.org/10.1037/h0100360

Anderson, C., Law, J. K., Daniels, A., Rice, C., Mandell, D. S., Hagopian, L., & Law, P. (2012). Occurrence and family impact of elopement in children with autism spectrum disorders. *Pediatrics*, *130*(5), 870–877. https://doi.org/10.1542/peds.2012-0762

Athens, E. S., & Vollmer, T. R. (2010). An investigation of differential reinforcement of alternative behavior without extinction. *Journal of Applied Behavior Analysis*, *43*(4), 569–589. https://doi.org/10.1901/jaba.2010.43-569

Bloom, S. E., Iwata, B. A., Fritz, J. N., Roscoe, E. M., & Carreau, A. B. (2011). Classroom application of a trial-based functional analysis. *Journal of Applied Behavior Analysis*, *44*(1), 19–31. https://doi.org/10.1901/jaba.2011.44-19

Boyle, M. A., & Adamson, R. M. (2017). Systematic review of functional analysis and treatment of elopement (2000-2015). *Behavior Analysis in Practice*, *10*(4), 375–385. https://doi.org/10.1007/s40617-017-0191-y

Boyle, M. A., Bacon, M. T., Brewer, E. M., Carton, S. M., & Gaskill, L. A. (2020). Evaluating a treatment without extinction for elopement maintained by access to stereotypy. *Journal of Applied Behavior Analysis*, *53*(3), 1531–1541. https://doi.org/10.1002/jaba.682

Boyle, M. A., Keenan, G., Forck, K. L., & Curtis, K. S. (2019). Treatment of elopement without blocking with a child with autism. *Behavior Modification*, *43*(1), 132–145. https://doi.org/10.1177/0145445517740871

Cipani, E., & Cipani, A. (2017). *Behavioral classification system for problem behaviors in schools: A diagnostic manual*. Springer Publishing Company, LLC.

DeLeon, I. G., & Iwata, B. A. (1996). Evaluation of a multiple-stimulus presentation format for assessing reinforcer preferences. *Journal of Applied Behavior Analysis*, *29*(4), 519–533. https://doi.org/10.1901/jaba.1996.29-519

DiGennaro Reed, F. D., Blackman, A. L., Erath, T. G., Brand, D., & Novak, M. D. (2018). Guidelines for using behavioral skills training to provide teacher support. *Teaching Exceptional Children*, *50*(6), 373–380. https://doi.org/10.1177/0040059918777241

Dunkel-Jackson, S. M., Kenney, K., Borch, S., & Neveu, C. N. (2018). Intervention evaluation of trial-based functional analyses in school. *Journal on Developmental Disabilities*, *23*(2), 55–65.

Gibson, J. L., Pennington, R. C., Stenhoff, D. M., & Hopper, J. S. (2010). Using desktop videoconferencing to deliver interventions to a preschool student with autism. *Topics in Early Childhood Special Education*, *29*(4), 214–225. https://doi.org/10.1177/0271121409352873

Hagopian, L. P., Boelter, E. W., & Jarmolowicz, D. P. (2011). Reinforcement schedule thinning following functional communication training: Review and recommendations. *Behavior Analysis in Practice*, *4*(1), 4–16. https://doi.org/10.1007/BF03391770

Hanley, G. P., Iwata, B. A., & Thompson, R. H. (2001). Reinforcement schedule thinning following treatment with functional communication training. *Journal of Applied Behavior Analysis*, *34*(4), 17–38. https://doi.org/10.1901/jaba.2001.34-17

Kamlowsky, M. E., Wilder, D. A., Ertle, H., Hodges, A. C., Colon, N., & Domino, L. (2021). Latency-based functional analysis and treatment of elopement. *Behavioral Interventions*, *36*(2), 329–341. https://doi.org/10.1002/bin.1781

Kiely, B., Migdal, T. R., Vettam, S., & Adesman, A. (2016). Prevalence and correlates of elopement in a nationally representative sample of children with developmental disabilities in the United States. *PLoS One*, *11*(2), e0148337. https://doi.org/10.1371/journal.pone.0148337

Kunnavatana, S. S., Bloom, S. E., Samaha, A. L., Lignugaris/Kraft, B., Dayton, E., & Harris, S. K. (2013). Using a modified pyramidal training model to teach special education teachers to conduct trial-based functional analyses. *Teacher Education and Special Education: The Journal of the Teacher Education Division of the Council for Exceptional Children*, *36*(4), 267–285. https://doi.org/10.1177/0888406413500152

Kunnavatana, S. S., Bloom, S. E., Samaha, A. L., Slocum, T. A., & Clay, C. J. (2018). Manipulating parameters of reinforcement to reduce problem behavior without extinction. *Journal of Applied Behavior Analysis*, *51*(2), 283–302. https://doi.org/10.1002/jaba.443

Lambert, J. M., Finley, C. I., & Caruthers, C. E. (2017). Trial-based functional analyses as basis for elopement intervention. *Behaviour Analysis: Research and Practice*, *17*(2), 166–173. https://doi.org/10.1037/bar0000058

Larkin, W., Hawkins, R. O., & Collins, T. (2016). Using trial-based analysis to design effective interventions for students diagnosed with autism spectrum disorder. *School Psychology Quarterly*, *31*(4), 534–547. https://doi.org/10.1037/spq0000158

Lerman, D. C., & Iwata, B. A. (1996). A methodology for distinguishing between extinction and punishment effects associated with response blocking. *Journal of Applied Behavior Analysis*, *29*(2), 231–233. https://doi.org/10.1901/jaba.1996.29-231

Lill, J. D., Bassingthwaite, B. J., & Cox, J. L. (2022). Applying behavior analytic consultation to schools to assess and treat a student's elopement. *Psychology in the Schools*, *59*(5), 1032–1045. https://doi.org/10.1002/pits.22489

Matson, J. L., & Vollmer, T. R. (1995). *User's guide: Questions about behavioral function (QABF)*. Scientific Publishers.

Mueller, M. M., & Nkosi, A. (2007). State of the science in the assessment and management of severe behavior problems in school settings: Behavior analytic consultation to schools. *International Journal of Behavioral Consultation and Therapy*, *3*(2), 176–202. https://doi.org/10.1037/h0100798

Neidert, P. L., Iwata, B. A., Dempsey, C. M., & Thomason-Sassi, J. L. (2013). Latency of response during the functional analysis of elopement. *Journal of Applied Behavior Analysis*, *46*(1), 312–316. https://doi.org/10.1002/jaba.11

Phillips, L. A., Briggs, A. M., Fisher, W. W., & Greer, B. D. (2018). Assessing and treating elopement in a school setting. *Teaching Exceptional Children*, *50*(6), 333–342. https://doi.org/10.1177/0040059918770663

Piazza, C. C., Fisher, W. W., Hanley, G. P., LeBlanc, L. A., Worsdell, A. S., Lindauer, S. E., & Keeney, K. M. (1998). Treatment of pica through multiple analyses of its reinforcing functions. *Journal of Applied Behavior Analysis*, *31*(2), 165–189. https://doi.org/10.1901/jaba.1998.31-165

Rajaraman, A., Hanley, G. P., Gover, H. C., Staubitz, J. L., Staubitz, J. E., Simcoe, K. M., & Metras, R. (2022). Minimizing escalation by treating dangerous problem behavior within an enhanced choice model. *Behavior Analysis in Practice*, *15*(1), 219–242. https://doi.org/10.1007/s40617-020-00548-2

Rapp, J. T. (2008). Conjugate reinforcement: A brief review and suggestions for applications to the assessment of automatically reinforced behavior. *Behavioral Interventions*, *23*(2), 113–136. https://doi.org/10.1002/bin.259

Rapp, J. T., & Vollmer, T. R. (2005). Stereotypy I: A review of behavioral assessment and treatment. *Research in Developmental Disabilities*, *26*(6), 527–547. https://doi.org/10.1016/j.ridd.2004.11.005

Rispoli, M., Burke, M. D., Hatton, H., Ninci, J., Zaini, S., & Sanchez, L. (2015). Training head start teachers to conduct trial-based functional analysis of challenging behavior. *Journal of Positive Behavior Interventions*, *17*(4), 1–10. https://doi.org/10.1177/1098300715577428

Rooker, G. W., Iwata, B. A., Harper, J. M., Fahmie, T. A., & Camp, E. M. (2011). False-positive tangible outcomes of functional analysis. *Journal of Applied Behavior Analysis*, *44*(4), 737–745. https://doi.org/10.1901/jaba.2011.44-737

Sigafoos, J., & Saggers, E. (1995). A discrete-trial approach to the functional analysis of aggressive behaviour in two boys with autism. *Australia & New Zealand Journal of Developmental Disabilities*, *20*(4), 287–297. https://doi.org/10.1080/07263869500035621

Skinner, B. F. (1957). *Verbal behavior*. Prentice-Hall, Inc.

Sundberg, M. L. (2008). *Verbal behavior milestones assessment and placement program: The VB-MAPP*. AVB Press.

Thomason-Sassi, J. L., Iwata, B. A., Neidert, P. L., & Roscoe, E. M. (2011). Response latency as an index of response strength during functional analyses of problem behavior. *Journal of Applied Behavior Analysis*, *44*(1), 51–67. https://doi.org/10.1901/jaba.2011.44-51

How to cite this article: Boyle, M. A., Monaco, B. L., & Ebeling, L. M. (2023). Treating elopement without extinction in a preschool setting. *Behavioral Interventions*, *38*(1), 268–282. https://doi.org/10.1002/bin.1909